國家實驗研究院
NATIONAL INSTITUTES OF APPLIED RESEARCH

ANNUAL REPORT
2025

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CONTENTS

EVOLUTION

2003

National Applied Research Laboratories (NARLabs) was established with six founding labs :

- National Chip Implementation Center (CIC)
- National Center for High-performance Computing (NCHC)
- National Center for Research on Earthquake Engineering (NCREE)
- National Nano Device Laboratories (NDL)
- National Laboratory Animal Center (NLAC)
- National Space Organization (NSPO)

2005

Two more labs joined NARLabs :

- Instrument Technology Research Center (ITRC)
- Science & Technology Policy Research and Information Center (STPI)

2008

Taiwan Ocean Research Institute (TORI) was established.

2011

Taiwan Typhoon and Flood Research Institute (TTFRI) was established.

2019

- Taiwan Typhoon and Flood Research Institute (TTFRI) was merged into National Science and Technology Center for Disaster Reduction (NCDR).
- National Chip Implementation Center (CIC) and National Nano Device Laboratories (NDL) were merged into Taiwan Semiconductor Research Institute (TSRI).
- Instrument Technology Research Center (ITRC) was renamed Taiwan Instrument Research Institute (TIRI).

2023

- The National Space Organization (NSPO) transitioned into a new legal entity under the NSTC and was renamed the Taiwan Space Agency (TASA)

2025

- NARLabs Announces Name Change to NATIONAL INSTITUTES OF APPLIED RESEARCH (NIAR)
- National Laboratory Animal Center (NLAC) was renamed National Center for Biomodels (NCB)
- Taiwan Instrument Research Institute (TIRI) was renamed National Center for Instrumentation Research (NCIR)

01

PREFACE

Message from the Chairperson

The National Institutes of Applied Research (NIAR) , an agency under the National Science and Technology Council (NSTC) , oversees seven national-level research centers. Its primary mission is to integrate core technology R&D platforms across disciplines while providing technical services to support scientific and technological research throughout Taiwan. Currently, Taiwan is transforming into an " AI Island " by promoting key policies such as the New Ten Major AI Infrastructure Projects. Therefore, the NSTC is leading efforts to advance critical technologies such as silicon photonics, high-speed quantum computing, and intelligent robotics. In addition, the NSTC is placing significant emphasis on strategic programs including " Sovereign AI " and the " Smart Living Ecosystem for All. " As a research institution dedicated to supporting national scientific development, NIAR must play a critical role in advancing these strategic initiatives.

In the era of AI, the strength of a country is increasingly defined by computing power. As such, the National Center for High-performance Computing (NCHC) has established the National Cloud Computing Power Center and formed the Taiwan Computing Alliance in collaboration with private-sector partners. These initiatives serve as critical drivers of " Sovereign AI " under the New Ten Major AI Infrastructure Projects. In addition, Taiwan aims to create a " Smart Living Ecosystem for All " by integrating computing infrastructure with the NCHC-developed AI application platform " TAIWAN AI RAP, " which supports industries across all sectors in adopting AI-driven solutions.

However, developing robust computing infrastructure is merely the first step. As AI models grow exponentially in scale, the key to the next stage of AI development lies in connectivity. In the future, the high-speed, low-energy exchange of system data and scalability of computing architectures will be more important than chip processing speed. As such, advancing silicon photonics and Co-Packaged Optics (CPO) while developing an " All-Optical Network " through international collaboration is critical to overcoming the energy and bandwidth constraints of data transmission and enabling AI systems to scale sustainably. To support the R&D of silicon photonics and help Taiwan become a leader and standard-setter in next-generation computing architectures, the Taiwan Semiconductor Research Institute has established a cross-disciplinary, shared R&D platform while cultivating interdisciplinary talent.

High-speed quantum computing technologies, which constitute a key component of the New Ten Major AI Infrastructure Projects, are driving a global technological revolution that is reshaping fundamental research, system development, and strategic international deployment. Currently, mainstream quantum computing systems and the chips used to read quantum computing results can only operate at extremely low temperatures. Therefore, the Taiwan Semiconductor Research Institute has established a superconducting quantum computing laboratory to advance academic research in quantum technology throughout Taiwan.

As technologies such as AI, big data, sensors, high-performance computing, communication networks, and advanced manufacturing continue to mature, intelligent robotics is increasingly being integrated into both everyday life and industrial applications. Taiwan's technological capabilities span the entire intelligent robotics value chain. Building on these

strengths, NIAR partnered with the National Center for Instrumentation Research (NCIR) to establish the Preparatory Office of the National Center for AI Robotics (NCAIR) in 2025. The official launch of the National Center for AI Robotics is scheduled for 2026. This initiative aims to integrate Taiwan's technological strengths to bolster the country's overall competitiveness. Through coordinated integration mechanisms, shared R&D platforms, and alignment with national strategic priorities, the Center seeks to advance AI robotics technology and industry development, lead the formulation of next-generation AI robotics architectures and standards, and collaborate with central and local governments to promote demonstration projects. Ultimately, these efforts aim to generate long-term value for both public policy and society.

In addition to supporting the New Ten Major AI Infrastructure Projects, NIAR also plays a critical role in several other key areas of national science and technology development. These include marine science and technology, a field that is essential to Taiwan's long-term development. The NSTC has established three core pillars for advancing this field : " Technological Enhancement of Maritime Security, " " Smart Transformation of Marine Industries, " and " Integration of Marine Culture into Everyday Life. " These strategies aim to establish Taiwan as a key player in global marine science and technology. In this context, the Taiwan Ocean Research Institute (TORI) supports policy implementation and cross-sector coordination by serving in key advisory and technical integration capacities. At the same time, TORI will position Taiwan as a leading marine science and technology hub in the western Pacific by supporting the establishment of an international observation and research station that assists the academic community in exploratory missions.

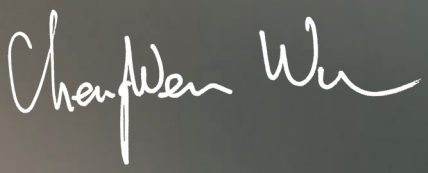
In biotechnology and pharmaceuticals, the 3Rs (Replacement, Reduction, and Refinement) framework for laboratory animals is an issue of global concern. Through cross-disciplinary and cross-center collaboration, NIAR has brought together the National Center for Biomodels (NCB), the National Center for Instrumentation Research (NCIR), and the Taiwan Semiconductor Research Institute (TSRI) to develop organ-on-a-chip technologies. By leveraging Taiwan's strong semiconductor capabilities, NIAR will also integrate AI to develop digital training platforms, foster new industries, and generate greater value. These efforts will help lift science and technology development in Taiwan to new heights.

The National Center for Research on Earthquake Engineering (NCREE) has also made widely recognized contributions to disaster prevention and mitigation for buildings in Taiwan. NCREE's early warning technology can detect an earthquake's weaker initial P-waves and, following rapid calculations, issue alerts before the arrival of stronger S-waves. In addition, NCREE's post-earthquake Structural Damage Assessment and Alert System has helped reduce earthquake-related risks by providing real-time analysis of building safety. NCREE has also translated academic research into tangible social benefits by assisting the Ministry of the Interior's National Land Management Agency in seismically retrofitting privately owned buildings and in formulating related seismic regulations.

The Science and Technology Policy Research and Information Center (STPI) is a professional, national-level think tank specializing in science and technology policy. It focuses on key technology issues of concern to government, industry, academia, and research institutions; conducts monitoring and analysis of emerging trends; and develops contextualized, structured, and systematic integrated strategic planning mechanisms for science and technology. STPI also provides data-driven evidence to support the government in making science and technology policy decisions. In addition, STPI makes significant contributions to Taiwan's academic advancement by compiling and analyzing information on global developments in science and technology research and development.

Looking ahead, NIAR will continue to serve as a driving force in Taiwan's scientific and technological development by supporting the NSTC. Across various fields, it will help translate academic research outcomes into practical applications that benefit the public, while actively assisting the government in advancing major science and technology policies. Through these efforts, NIAR aims to contribute to Taiwan's prosperity over the next decade and beyond.

Chairperson



Message from the President

In 2025, the National Institutes of Applied Research (NIAR) achieved many significant milestones. First, it changed its English name from the National Applied Research Laboratories to its current name. NIAR's new name, which is pronounced "near," reflects its commitment to integrating diverse technologies, remaining relevant to everyday life, and engaging with the world. In addition, the National Center for Biomodels (NCB) and the National Center for Instrumentation Research (NCIR) were also renamed. During the same year, NIAR established the Preparatory Office of the National Center for AI Robotics. Toward the end of the year, President Lai Ching-te recognized NIAR's outstanding achievements by attending and officiating two NIAR-organized events.

NCB, formerly known as the National Laboratory Animal Center, is an institution with the core mission of providing animal resources. In recent years, it has increasingly strengthened its experimental services to enhance translational biomedical testing capabilities by establishing a platform that leverages forward-looking, cross-disciplinary biomodels, which include animal models, cell models, and computational models. In light of this expanded scope and mission, NCB was renamed. Additionally, the Taiwan Instrument Research Institute was renamed NCIR to underscore its status as a national-level research institution.

The Taiwan Ocean Research Institute (TORI) is currently enhancing Taiwan's overall technological self-reliance by establishing a Heavy-Duty Ocean Scientific Instrumentation R&D and Manufacturing Base that will serve as a core platform for the domestic development, testing, and production of large-scale marine exploration equipment. TORI is also planning to establish a Western Pacific International Observation and Research Station to enhance the impact of Taiwan's marine science research. The National Center for Research on Earthquake Engineering (NCREE) , in addition to continuing its research and development of seismic isolation and vibration reduction technologies for buildings, is reducing carbon emissions by integrating international technical experience with locally sourced materials to develop low-carbon concrete. Besides serving as a science and technology policy think tank, the Science and Technology Policy Research and Information Center (STPI) has also continued to assist the government in promoting innovation and entrepreneurship. STPI has fostered an environment of sustainable growth for Taiwan's innovation and entrepreneurship ecosystem by incubating 581 startups while attracting more than NT$13.5 billion in private investment over the past decade.

In addition to enhancing their research and service capabilities, NIAR's centers have strengthened cross-center collaboration to generate more interdisciplinary research outcomes. For example, the NCB, the Taiwan Semiconductor Research Institute (TSRI) , NCIR, and the National Center for High-performance Computing (NCHC) jointly developed the Taiwan Next-Generation Preclinical Drug Risk Assessment System. Additionally, NCHC and STPI collaboratively developed TAIDE, a trustworthy generative AI dialogue engine. By integrating expertise from fields such as information science, library and information science, history, management, social work, science and technology studies, and science education, TAIDE helps prevent bias and errors in the development of foundational models. These initiatives represent the tangible impact of cross-center collaboration.

Examples of fruitful collaboration between NIAR and academia include a partnership between NCB, NCHC, and National Cheng Kung University to establish a digital pathology system, as well as NCIR and National Yang Ming Chiao Tung University working together to develop the Cyto Chamber, an automated stem cell culture and differentiation system. Meanwhile, TSRI collaborated with Macronix International to develop high-bandwidth memory for artificial intelligence chips, and NCIR partnered with DEUVtek to develop infrared nanosecond laser grinding technology. These initiatives represent joint efforts with industry to develop technologies that can be rapidly applied in the real world. Through continuous engagement and exchange with experts from academia and industry, NIAR further enhances its own growth and development.

In terms of international collaboration, NIAR has continued to strengthen its engagement across the globe. In addition to maintaining jointly held biennial bilateral forums with Korea and Thailand, NIAR now serves as part of Taiwan's " national team. " In this national-level role, NIAR strengthened Taiwan's international linkages in forward-looking biomedical

technologies by partnering with France's leading biomedical research institution, the French National Institute of Health and Medical Research (Inserm) , and 24 Taiwanese and French researchers to co-host the Taiwan-France Organs-on-Chips Science Forum. In addition, NIAR further demonstrated Taiwan's research strength in semiconductors and cross-disciplinary innovation by attracting more than 300 international professionals to the Second Taiwan–Europe Chip Innovation Forum in Germany. NIAR also continues to co-propose research projects with international partners, cultivate globally oriented scientific talent, and strengthen technical exchange through international internship programs and reciprocal research visits. In addition to demonstrating NIAR's impact in international collaboration, these achievements also highlight NIAR's critical role in connecting industry, academia, and research institutions while advancing cross-disciplinary integration and innovative applications.

In addition to collaborating with domestic and international partners from academia, industry, and research institutions, we have taken proactive steps to build an integrated, cross-sector R&D ecosystem that promotes resource sharing and interdisciplinary collaboration. The establishment of the Preparatory Office of the National Center for AI Robotics stands as a prime example of how we are responding to current challenges while achieving national goals. AI robotics is a highly complex field that brings together artificial intelligence, mechatronics, semiconductors, communication technologies, and sensing systems. The field presents significant challenges in system integration, an area where NIAR can deliver its greatest value. With our cross-disciplinary research centers, comprehensive experimental facilities, and highly skilled technical workforce, NIAR is well positioned to provide end-to-end support, from proof of concept to full system development, for academic institutions and industrial entities across Taiwan.

The National Center for AI Robotics, scheduled to be established in 2026, will take on three core roles : technology integrator, application enabler, and ecosystem builder. Building on NIAR's existing foundation, we are driving cross-center collaborative innovation by integrating the AI computing resources of NCHC, the sensing and platform technologies of NCIR, key chip technologies of TSRI, and the safety monitoring and 3D modeling expertise of NCREE. At the same time, we will enhance Taiwan's visibility in global robotics by working closely with international partners and engaging in technical exchanges and reciprocal talent programs with institutions in Europe, the US, and Japan.

To advance toward an AI-driven smart nation, the government has actively promoted the New Ten Major AI Infrastructure Projects. As a government-affiliated research organization under the National Science and Technology Council (NSTC) , NIAR plays a significant role in achieving these aims. In December 2025, NIAR held the inauguration ceremony for the NCHC's Cloud Computing Center in Tainan, followed by the Taiwan Silicon Photonics CPO–AI Ecosystem Forum in Hsinchu. These events served as key components of the New Ten Major AI Infrastructure Projects. As such, President Lai Ching-te personally presided over both. His presence not only underscored the importance of these initiatives but also greatly boosted morale within NIAR, strengthening our resolve in related efforts moving forward.

The NCHC's Cloud Computing Center has a total power capacity of 15 MW and serves both as a large-scale AI/HPC computing facility and an international telecommunications hub. It supports advanced research applications such as generative AI training, climate modeling, life sciences, and semiconductor R&D. The facility, which incorporates a seismic-resilient design developed by NCREE, has become a critical component of the nation's computing capacity by enabling the secure deployment of the latest Jingchuang 26 (Nano 4) supercomputer. By further connecting with private-sector partners through the Taiwan Computing Alliance and integrating the NCHC-developed AI application platform TAIWAN AI RAP, the NCHC's Cloud Computing Center can support industries across the board in developing diverse AI applications and advancing a smart living ecosystem for people throughout Taiwan.

Global computing architectures are shifting from a focus on " enhancing chip performance " to " optimizing overall system efficiency. " At the heart of this transition are silicon photonics and Co-Packaged Optics (CPO) . Accordingly, the NSTC had TSRI organize the Taiwan Silicon Photonics CPO–AI Ecosystem Forum, which brought together leading companies and academic and research teams in related fields to discuss future development strategies. Silicon photonics and CPO encompass multiple technological domains, including materials, fabrication processes, packaging, optoelectronic interfaces, and system architectures. The key to future advancement lies in systematically integrating these capabilities to form a sustainable and continuously evolving R&D network, while also strengthening efforts in talent development. Looking ahead, NIAR will assume significant responsibilities in this area. By supporting the NSTC in integrating the strengths of academia, research institutions, and industry, NIAR aims to help Taiwan gain mastery of critical core technologies.

In the future, under the guidance of the NSTC, NIAR will continue driving Taiwan's scientific advancement forward by strengthening its research and service capabilities. It will also remain committed to ensuring that the outcomes of academic research generate tangible benefits for societal development, improve the quality of life for the public, and demonstrate the value of NIAR's role in national development.

President

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R&D SERVICE PLATFORM ACHIEVEMENT AWARDS

AWARD BACKGROUND

For many years, the primary objective of the National Institutes of Applied Research (NIAR) has been "Global Excellence, Local Impact". As such, NIAR, with the support and guidance of the National Science and Technology Council (NSTC), has set up costly facilities that individual universities in Taiwan are often unable to procure on their own. Through these efforts, NIAR has been able to contribute to the well-being of people throughout Taiwan by developing a wide range of professional R&D service platforms that support academic and research institutions to develop cutting-edge technologies.

To this end, NIAR held the 5th R&D Service Platform Awards to recognize the outstanding achievements of researchers from academia, the public and private sectors, and research institutions that utilized NIAR's R&D service platforms. This year, nine exceptional research teams were selected for this honor.

As scientific research becomes more complex, breakthroughs increasingly rely on interdisciplinary partnerships and advanced equipment. These are two areas in which NIAR's various R&D service platforms excel. By forging closer ties with Taiwan's academic and research communities, the R&D Service Platform Awards aim to encourage globally impactful research that utilizes the national-level resources of these R&D service platforms.

High Distinction

Project	R&D Service Platform Used
Semiconductor Metasurfaces and Their Applications in Silicon Photonics, Ultraviolet Optoelectronics, and Bio-medical Sensing	Fabrication platform for Metalens-structures (TSRI)

Research Team

Ming-Lun Tseng
Distinguished Professor, Department of Civil Engineering, NTU

Excellence

Project	R&D Service Platform Used
Development and Applications of Advanced Seismic-Resistant Steel Structure Technologies	Research Platform for Earthquake Engineering Simulation (NCREE)

Research Team

Chung-Che Chou
Distinguished Professor, Department of Civil Engineering, National Taiwan University.

Excellence

Project	R&D Service Platform Used
Novel Topological Materials Prediction	Taiwania 3 Supercomputer (NCHC)

Research Team

Tay-Rong Chang
Professor, Department of Physics, National Cheng Kung University

Excellence

Project	R&D Service Platform Used
Decoding the Structural Secrets of Complex Chemical Materials through Machine Learning and Materials Simulations	Taiwania 3 Supercomputer (NCHC)

Research Team

Chun-Wei Pao
Research Fellow, Research Center for Applied Sciences, Academia Sinica

Excellence

Project	R&D Service Platform Used
CMOS-MEMS Resonant Capacitive Transducer Platform and Dual-Gap CMUT Arrays	CMOS-MEMS Chip Design and Tapeout Service (TSRI)

Research Team

Sheng-Shian Li
Distinguished Professor, Department of Power Mechanical Engineering/Institute of NanoEngineering and MicroSystems, National Tsing Hua University

Wei-Hsiang Hsu
Postgraduate, Institute of NanoEngineering and MicroSystems, National Tsing Hua University

Hung-Yu Chen
Postdoctoral Researcher, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley

Honorable Mention

Project

Applications of Deep Learning on High-Performance Computing Platforms: Dynamic Scheduling, Smart Healthcare, and Renewable Energy Forecasting

R&D Service Platform Used

Taiwania 2 Supercomputer (NCHC)

Research Team

Chien-Liang Liu
Professor, Department of Industrial Engineering and Management, National Yang Ming Chiao Tung University

Honorable Mention

Project

Advancing Emerging Fuel Cell Technologies through the Integration of Theoretical Modeling and Experimental Innovation

R&D Service Platform Used

Taiwania 2 Supercomputer (NCHC)

Research Team

Yong-Man Choi
Professor, Institute of Photonic System, National Yang Ming Chiao Tung University

Honorable Mention

Project

Innovative Breakthroughs in Materials and Chemical Design through the Integration of Quantum Chemistry and Artificial Intelligence

R&D Service Platform Used

Taiwania 3 Supercomputer (NCHC)

Research Team

Yi-Pei Li
Associate Professor, Department of Chemical Engineering, National Taiwan University

Honorable Mention

Project

The Development and Applications of High-Resolution Air Quality Forecasting and Diagnostic Models

R&D Service Platform Used

Taiwania 3 Supercomputer (NCHC)

Research Team

Chuan-Yao Lin
Research Fellow, Research Center for Environmental Changes, Academia Sinica CEO, Air Quality Research Center, Academia Sinica

Yang-Fan Sheng
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Wan-Chin Chen
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Charles Chung-Kuang Chou
Research Fellow and Deputy Director, Research Center for Environmental Changes, Academia Sinica

Wenmei Chen
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Ming-Tung Chuang
Associate Research Specialist, Research Center for Environmental Changes, Academia Sinica

High Distinction

Semiconductor Metasurfaces and Their Applications in Silicon Photonics, Ultraviolet Optoelectronics, and Biomedical Sensing

A research team led by Assistant Professor Ming-Lun Tseng of the Institute of Electronics at National Yang Ming Chiao Tung University demonstrated that silicon exhibits a surface polariton effect under deep ultraviolet (DUV) illumination, significantly enhancing light–matter interactions. This breakthrough establishes silicon as a promising platform for next-generation ultraviolet spectroscopic detection chips, with strong potential for advanced nanomaterial characterization and biomedical sensing applications.

The team further developed deep-ultraviolet aluminum nitride (AlN) super-resolution metalenses capable of resolving extremely fine structures. In collaboration with the University of Tokyo, silicon micro- and nanostructures were fabricated using deep-ultraviolet ultrafast lasers, validating the applicability of AlN metalenses in deep-ultraviolet optoelectronic and industrial applications.

In addition, germanium nanophotonic crystal chips were developed for broadband biomedical sensing. Fully compatible with standard semiconductor manufacturing processes, these chips demonstrate strong potential for scalable mass production.

Awardee

Ming-Lun Tseng

Assistant Professor, the Institute of Electronics, National Yang Ming Chiao Tung University

R&D Service Platform Used /
Fabrication platform for Metalens structures (TSRI)

Excellence

Development and Applications of Advanced Seismic-Resistant Steel Structure Technologies

Buckling-restrained braces (BRBs) are a critical innovation for enhancing the seismic performance of buildings. A research team led by Distinguished Professor Chung-Che Chou, from the Department of Civil Engineering at National Taiwan University, developed a clamp-type steel buckling-restrained energy-dissipating brace, which replaces the concrete traditionally used in BRBs with steel. This design enables rapid inspection and repair after an earthquake. Its steel components can be reused, making it an environmentally sustainable technology to enhance seismic resistance of buildings. In addition, due to the challenges of building and testing on full-scale specimens, the team adopted a hybrid simulation approach that integrates numerical modeling with structural component testing. Experimental data were continuously fed back into the computational model in the simulation procedure, allowing the researchers to capture the true behavior of building structures under seismic loading.

Awardee

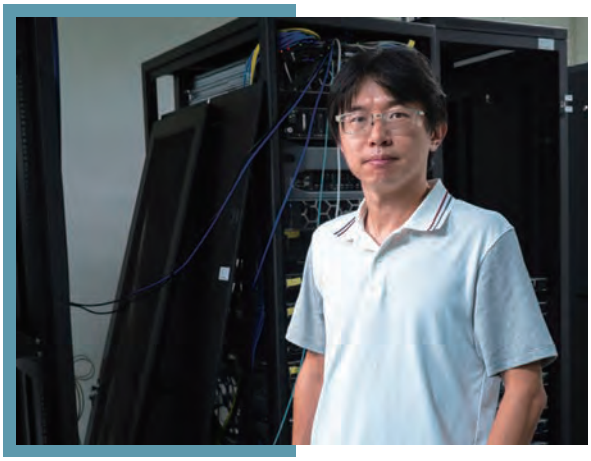
Chung-Che Chou

Distinguished Professor, Department of Civil Engineering, National Taiwan University.

R&D Service Platform Used / Research Platform for Earthquake Engineering Simulation (NCREE)

Excellence

Prediction of Novel Topological Materials



The prediction of topological materials forms a critical foundation for future research in advanced technologies such as topological insulators, topological superconductors, and quantum computing. A research team led by National Cheng Kung University Department of Physics Professor Tay-Rong Chang conducted studies spanning topological materials, quantum anomalous Hall effects, nonlinear electronic properties, antiferromagnetic diodes, and spin valves. Their work, which has been published in top-tier journals including *Science, Nature Communications, Nature Electronics, Physical Review B,* and *Materials Today Physics*, has demonstrated theoretical capabilities in computational condensed matter physics and materials science.

The team has also laid a solid foundation for topological electronic design and smart sensing applications in chemical and biomedical material systems by demonstrating their ability to propose models and make predictions of novel quantum phenomena. In addition, part of their research on material design has been experimentally validated, highlighting its potential for practical applications.

Awardee

Tay-Rong Chang

Professor, Department of Physics, National Cheng Kung University

R&D Service Platform Used /
Taiwania 3 Supercomputer (NCHC)

Excellence

Unlocking the Structural Secrets of Complex Chemical Materials through the Integration of Machine Learning and Materials Simulation

High-entropy alloys have emerged as an important class of advanced materials in recent years. However, their chemical compositions and corresponding microstructures are extremely complex. Therefore, a research team led by Academia Sinica Research Center for Applied Sciences Research Fellow Chun-Wei Pao successfully elucidated the atomic structure of a high-entropy alloy composed of cobalt, nickel, hafnium, titanium, and zirconium by combining theoretical simulations with experimental results. This breakthrough was published in *Nature*.

The team also enabled large-scale simulations of mechanical properties by training machine-learning models capable of efficiently reproducing quantum-chemistry calculation results. For the first time, they identified the relationship between the alloy's unique mechanical properties and its microstructure, with these findings published in *Nature Communications*. This work provides a new direction for the future development of novel and complex materials through high-performance computing.

Awardee

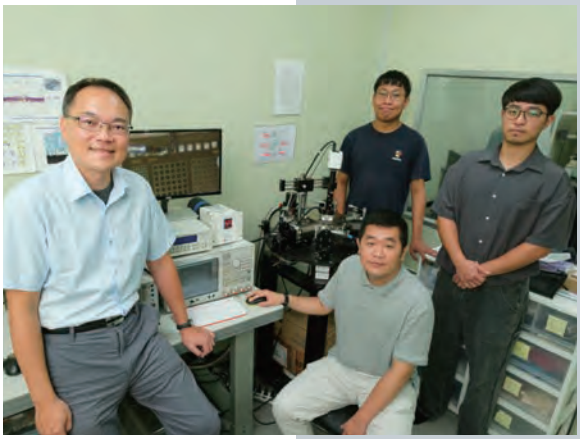
Chun-Wei Pao

Research Fellow, Research Center for Applied Sciences, Academia Sinica

R&D Service Platform Used /
Taiwania 2 AI Supercomputer (NCHC)

Excellence

CMOS-MEMS Resonant Capacitive Transducer Platform and Dual-Gap CMUT Array



A research team led by Chair Professor Sheng-Shian Li of National Tsing Hua University applied its proprietary fabrication technology to capacitive micromachined ultrasonic transducers (CMUTs) , pioneering the dual-gap CMUT-on-CMOS architecture. This innovation achieves both high-efficiency ultrasonic output and high reception sensitivity.

The work was selected as a Highlighted Paper at the IEEE International Electron Devices Meeting (IEDM) 2024 and featured in *Nature Electronics*, underscoring its global academic impact.

By integrating CMUTs with interface circuitry, the team developed a single-chip ultrasound system enabling compact and cost-effective ultrasound probes. This technology is expected to advance the development of home-use and portable ultrasound diagnostic devices.

Awardees

Sheng-Shian Li

Distinguished Professor, Department of Power Mechanical Engineering/Institute of NanoEngineering and MicroSystems, National Tsing Hua Chair Professor

Hung-Yu Chen

Postdoctoral Researcher, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley

Wei-Hsiang Hsu

Postgraduate, Institute of NanoEngineering and MicroSystems, National Tsing Hua University

R&D Service Platform Used /
CMOS-MEMS Chip Design and Tapeout Service (TSRI)

Honorable Mention

Multi-modal Deep Learning for High-Performance Computing Platforms: Dynamic Scheduling, Smart Healthcare, and Renewable Energy Forecasting

A research team led by National Yang Ming Chiao Tung University Department of Industrial Engineering and Management Professor Chien-Liang Liu developed an AI model capable of analyzing electrocardiogram (ECG) features to detect rare diseases such as the inheritable heart disorder, Brugada syndrome. The ECG characteristics of Brugada syndrome resemble those of arrhythmias and palpitations, but the condition can lead to heart failure or sudden cardiac death. However, developing AI models for rare diseases like Brugada syndrome is challenging due to limited training data. Therefore, the team addressed this issue using transfer learning, which enabled physicians to make early and accurate diagnoses of Brugada syndrome.

In addition, the team developed a model that can enable efficient and reliable automated quality control by first determining whether items are defective and then indicating the precise location of such defects. They also created a smart dynamic scheduling framework that allows real-time decision-making for production lines. When unexpected events occur, the system can respond rapidly based on updated conditions without needing to recompute the entire schedule.

Awardee

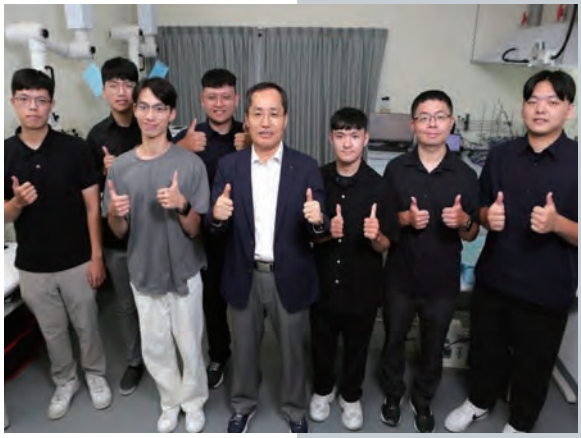
Chien-Liang Liu

Professor, Department of Industrial Engineering and Management, National Yang Ming Chiao Tung University

R&D Service Platform Used /
Taiwania 2 AI Supercomputer (NCHC)

Honorable Mention

Integrating Theoretical Modeling and Experimental Innovation to Advance Emerging Fuel Cell Technologies



A research team led by National Yang Ming Chiao Tung University Institute of Photonic System Professor Yong-Man Choi designed materials at the atomic scale while integrating theoretical predictions with experimental results to develop novel solid oxide fuel cells (SOFCs). These SOFCs exhibit high redox reaction activity and strong resistance to carbon dioxide. Notably, these SOFCs also have a significantly enhanced lifetime and operational stability because their fabricated anodes can operate in dry methane for hundreds of hours without carbon deposition or rapid degradation. In addition, the team has achieved substantial performance improvements in next-generation protonic ceramic fuel cells (PCFCs). By enabling compatibility with a wider range of fuels while enhancing durability, these advances bring PCFC technology closer to practical, real-world applications.

Awardee

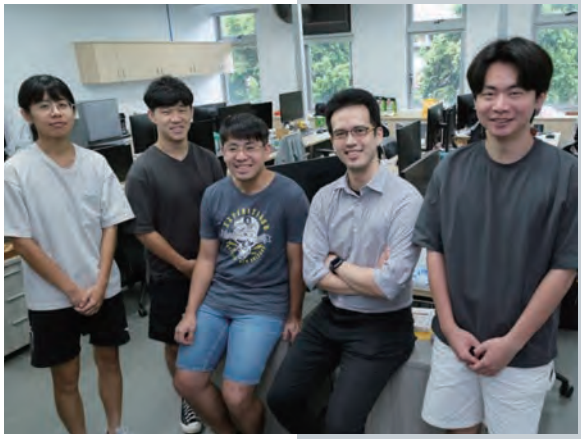
Yong-Man Choi

Professor, Institute of Photonic System, National Yang Ming Chiao Tung University

R&D Service Platform Used /
Taiwania 2 Supercomputer (NCHC)

Honorable Mention

Integrating quantum chemistry and artificial intelligence to drive innovative breakthroughs in materials and chemical design



A research team led by National Taiwan University Department of Chemical Engineering Associate Professor Yi-Pei Li employed machine learning approaches while utilizing databases to train models to predict molecular properties and chemical reaction trends. This approach ensured that chemical design could be carried out efficiently under limited resources by replacing certain experimental steps with simulations. Furthermore, data is often insufficient in chemical research. This can lead machine learning models to produce unreliable predictions, which are analogous to the "AI hallucinations" that may occur when using AI systems. To address this issue, the team developed an interpretable AI model based on uncertainty quantification. This model can identify the conditions under which prediction uncertainty is higher and provide error ranges and other critical information. This enables research teams to assess the direction of experimental design more effectively.

Awardee

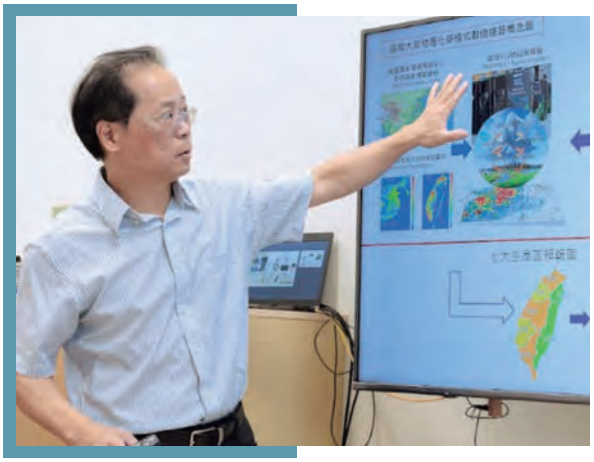
Yi-Pei Li

Associate Professor, Department of Chemical Engineering, National Taiwan University

R&D Service Platform Used /
Taiwania 3 Supercomputer (NCHC)

Honorable Mention

Development and Application of a High-Resolution Air Quality Forecasting and Diagnostic Model



A research team led by Academia Sinica Research Center for Environmental Changes Research Fellow Chuan-Yao Lin developed a high-resolution air quality forecasting model for Taiwan. By predicting air quality across the island up to 72 hours in advance, this model allows the public to take protective measures ahead of time. During the model validation process, the team improved the horizontal grid resolution of the forecasting model to 3 kilometers by using high-precision data from the Ministry of Environment's national air quality monitoring stations. The team also used LiDAR to capture the spatial distribution of pollutants and to assess the impact of estimated wind speeds on air pollution. In addition, the team utilized satellite remote sensing to map the spatial distribution of nitrogen dioxide (NO_2) across Taiwan based on molecular spectral features. By estimating emission volumes and identifying key pollution sources, this approach helped the team validate data on the emissions of ground-level pollutants in Taiwan.

Awardees

Chuan-Yao Lin
Research Fellow, Research Center for Environmental Changes, Academia Sinica CEO, Air Quality Research Center, Academia Sinica

Charles Chung-Kuang Chou
Research Fellow and Deputy Director, Research Center for Environmental Changes, Academia Sinica

Yang-Fan Sheng
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Wenmei Chen
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Wan-Chin Chen
Research Assistant, Research Center for Environmental Changes, Academia Sinica

Ming-Tung Chuang
Associate Research Specialist, Research Center for Environmental Changes, Academia Sinica

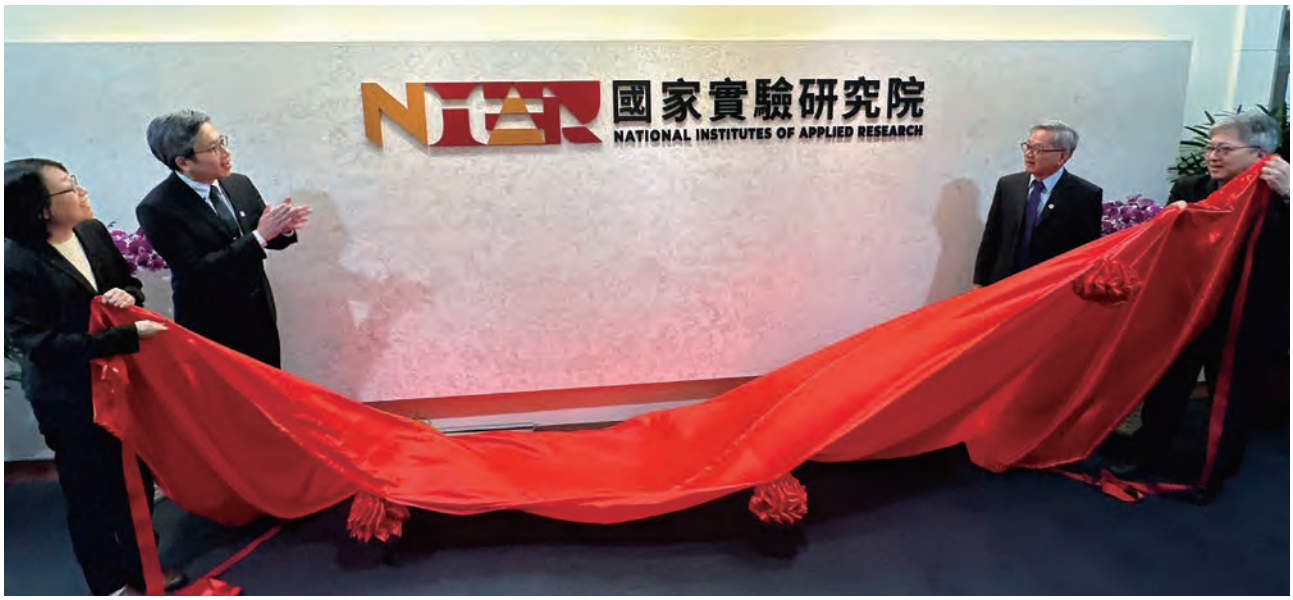
R&D Service Platform Used /
Taiwania 3 Supercomputer (NCHC)

03

HIGHLIGHTS

Headquarters

NIAR Changes Its English Name to NATIONAL INSTITUTES OF APPLIED RESEARCH



Distinguished guests unveiling the plaque bearing NIAR's new name (from left) : NIAR board member and Vice President of Academia Sinica Dr. Mei-Yin Chou; NIAR President Dr. Hung-Ying Tsai; NIAR Chairperson and Minister of the National Science and Technology Council Dr. Cheng-Wen Wu; and NIAR board member and Professor of Electrical Engineering at National Taiwan University Dr. Zse-Hong Tsai.

In March, the National Applied Research Laboratories (NARLabs) announced a change to its English name to NATIONAL INSTITUTES OF APPLIED RESEARCH (NIAR, pronounced "near") .

At the same time, NIAR introduced a new corporate identity system featuring its updated English abbreviation, "NIAR." The new identity reflects the organization's mission to integrate diverse technologies, transcend technological boundaries, bridge academia and industry, promote cross-disciplinary collaboration, expand its global outlook, and strengthen international engagement.

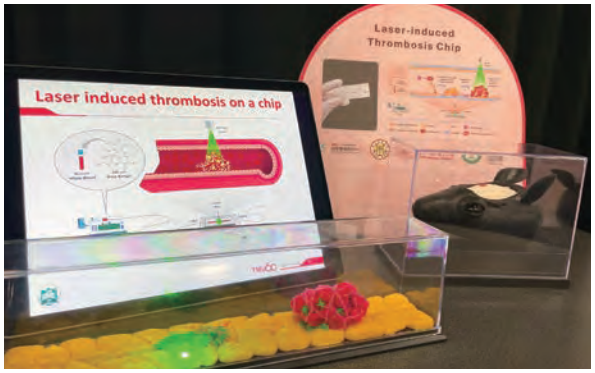
The redesigned identity incorporates elements such as fractals, arches, obelisks, and rounded curves, symbolizing NIAR's depth and structural solidity. The fractal "AR" conveys boundless exploration, continuous innovation, and openness. The arch-shaped "I" and obelisk-shaped "A" embody structural strength and resilience, representing the foundation of scientific research ; their upward forms further signify the pursuit of technological leadership. Meanwhile, the rounded curve of the "R" symbolizes harmony and wholeness, underscoring NIAR's role as a central coordinator and connector among industry, government, and academia, advancing progress through a steady and integrative approach.

In terms of color, the new identity retains NIAR's original palette, combining the gravitas of gold with a vibrant red to present a brand image characterized by stability and confidence.

In addition, NIAR's National Laboratory Animal Center has been renamed the National Center for Biomodels (NCB) . The Taiwan Instrument Research Institute has also been renamed the National Center for Instrumentation Research (NCIR) .

NCB

Thrombosis Chip Wins CES 2025 Innovation Award



Laser-induced thrombosis chip(left) and laser-induced mouse stroke model(right). In the thrombosis chip, laser stimulation trigger thrombus formation within microfluidic channels. This human-based thrombosis model can be used to test the efficacy of thrombolytic drugs while reducing reliance on mouse stroke models.

Through cross-institutional collaboration, the National Center for Biomodels has jointly developed a “Laser-Induced Thrombosis-on-a-Chip Microsystem.” This platform uses human vascular endothelial cells and blood to simulate thrombus formation and thrombolysis in vitro, thereby overcoming interspecies differences and improving the accuracy of drug efficacy evaluation. By integrating in vitro assays with animal disease models, the dual-track testing strategy accelerates preclinical translation. The technology has been awarded the CES 2025 Innovation Award, highlighting Taiwan’s competitiveness in biochip technology and drug development.

NCHC

Ten Major AI Infrastructure Projects — Launching the NCHC Cloud Computing Center for Sovereign AI

President Lai Ching-te, accompanied by the Minister of the National Science and Technology Council Cheng-Wen Wu, Tainan Mayor Huang Wei-che, and other distinguished guests, officially inaugurating the NCHC Cloud Computing Center.

The NCHC Cloud Computing Center, located in the Southern Taiwan Science Park, was officially inaugurated on December 12 during a ceremony presided over by President Lai Ching-te. The inauguration marked a significant milestone for Taiwan's development of sovereign AI and advanced computing infrastructure. The NCHC Cloud Computing Center has adopted a five-layer vertically integrated design with a power capacity of 15MW. It also integrates advanced energy-efficient systems, enhanced seismic resilience, and redundant backup capabilities. The facility is connected via high-speed fiber optics to research institutions across southern Taiwan and the rest of the country. This gives Taiwan's academic community and industrial institutions enhanced access to high-performance AI and HPC. The NCHC Cloud Computing Center has also fostered scientific research and industrial applications by deploying the Nano 4 supercomputer. This has provided a critical foundation for next-generation technological development and the upgrading of southern Taiwan’s industrial ecosystem.

NCHC

TAIWAN AI RAP Launches Services to Boost Domestic Development of Generative AI

National Science and Technology Council Minister Cheng-Wen Wu visits the Agricultural Technology Research Institute booth.

TAIWAN AI RAP was officially launched in April. Since then, it has showcased a range of localized generative AI applications through serving more than 100 organizations. In the medical sector, the platform has supported smart emergency shift handover and patient inquiry services. In education, TAIWAN AI RAP has enabled context-aware teaching assistants in classrooms. In agriculture, the " Ask AI About Pigs " service has helped farmers obtain practical information. In the corporate sector, TAIWAN AI RAP has enhanced knowledge management while improving the efficiency of customer service. This platform, which has integrated the TAIDE model, continues to strengthen the processing capabilities of Traditional Chinese. Thus, it has played a key role in connecting applications across different fields and advancing the localization of generative AI in Taiwan.

TORI

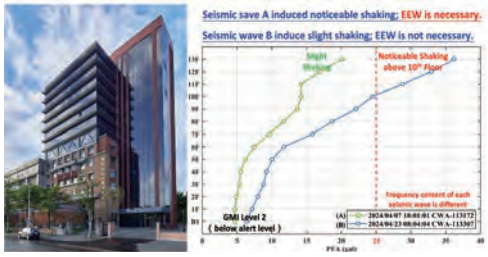
Breaking Ground for the Industrial Marine Scientific Instrument R&D and Manufacturing Base — Advancing the Domestic Development of Scientific Instruments

NIAR President Hung-Yin Tsai presides over the groundbreaking ceremony, marking the start of the project.

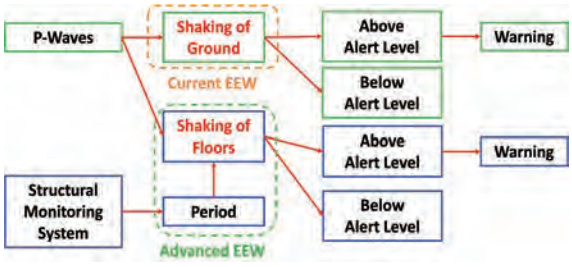
As a maritime nation, Taiwan is committed to the sustainable development of forward-looking ocean science and specialized marine surveys by building shared platforms for ocean resources. To this end, the Taiwan Ocean Research Institute held the groundbreaking ceremony for the construction of the Industrial Marine Scientific Instrument R&D and Manufacturing Base on March 16. By facilitating the domestic R&D of scientific instruments, the base aims to strengthen Taiwan's self-reliance in the marine industry, enhance the research effectiveness, and support academic research, industrial development, talent cultivation, and science education.

NCREE

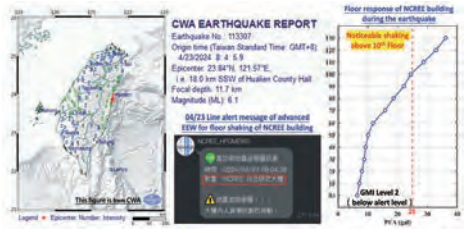
Intelligent Structural Monitoring Technology and Application — Advanced Earthquake Early Warning System for Floor Vibration of High-Rise Buildings



Seismic waves of the same ground shaking intensity producing different floor shaking levels of the same building



Concept of current earthquake early warning alert and advanced earthquake early warning alert for floor vibration of high-rise building.



Example of advanced earthquake early warning alert during one aftershock of the 2024 Hualien earthquake.

Current earthquake early warning systems issue alerts based on estimated ground shaking intensity in a given area. However, some seismic waves that do not reach warning thresholds at the ground surface can still cause severe shaking of high-rise buildings due to resonance effects. Therefore, the National Center for Research on Earthquake Engineering (NCREE) developed an Advanced Earthquake Early Warning System for floor vibration of High-Rise Buildings, which uses initial seismic waves to assess whether subsequent waves are likely to induce strong floor shaking of tall buildings. The system then determines whether to issue an alert, which reduces potential damage by enabling residents on higher floors to take protective measures before intense floor shaking occurs.

TSRI

Silicon Photonics CPO-AI Ecosystem Forum

President Lai Ching-te visits the exhibition booth of Accelink Technologies.

In response to the transformation of computing architectures driven by generative AI, the Executive Yuan launched the " Ten Major AI Infrastructure Projects, " focusing on key technologies such as silicon photonics and Co-Packaged Optics (CPO) . On December 19, TSRI assisted the National Science and Technology Council (NSTC) in hosting a forum in Hsinchu, personally presided over by President Lai Ching-te.
TSRI will serve as a national-level neutral integration and validation platform for silicon photonics and CPO technologies, connecting industry, academia, and research institutions to accelerate implementation and enhance Taiwan's competitiveness in the AI industry.

STPI

Building Innovation Ecosystem Service Platform to Accelerate the Commercialization of Taiwan's Research

Functional diagram of the HUZU platform.

For many years, the Science & Technology Policy Research and Information Center (STPI) has been committed to revitalizing Taiwan's academic and research innovation ecosystem. Building on more than a decade of experience in innovation and entrepreneurship mentorship, STPI has developed Innovation Ecosystem Service Platform — the HUZU Platform. The platform focuses on addressing key pain points in Taiwan's industry–academia collaboration by providing AI-assisted solutions. Its core functions include: an AI entrepreneurship tool that integrates technological and business analysis to rapidly generate draft business plans; a two-way translation tool that bridges communication between academic research and the needs of commercial R&D; an intelligent matchmaking service that overcomes limited professional networks and geographic constraints to facilitate precise industry–academia partnerships. As such, the HUZU Platform aims to accelerate the transition of scientific research from the laboratory to the market by supporting research teams to speed up the commercialization and application of their technologies.

NCIR

Developing Laser Grinding Technology to Significantly Boost Silicon Carbide Wafer Manufacturing Capacity

NIAR President Hung-yin Tsai and National Center for Instrumentation Research Director General Cheng-Tang Pan jointly host a press conference with industry partners to present the research outcomes.

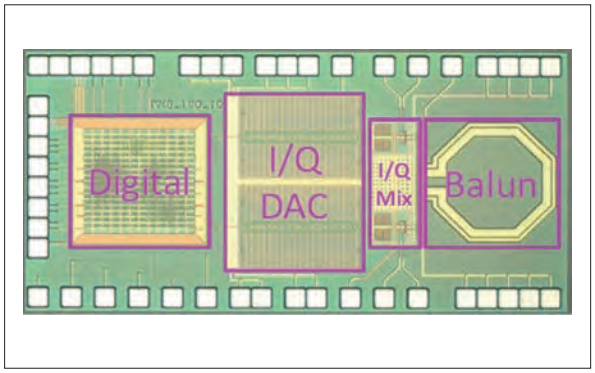
To meet the growing demand for high-performance power electronics driven by electric vehicles, 5G, and low-Earth-orbit satellites, the National Center for Instrumentation Research (NCIR) has collaborated with DEUVtek to develop an infrared nanosecond laser grinding process for silicon carbide (SiC) wafers. This breakthrough fulfills industry needs for high-efficiency and low-loss manufacturing processes by significantly increasing grinding speed and quality while reducing costs and material loss. By supporting the mass production of domestically developed compound semiconductor power devices, this new technology helps facilitate the development of applications in electric vehicles, renewable energy, and information and communications technologies.

04

R&D AND SERVICE ACCOMPLISHMENTS

TSRI

Taiwan's First Silicon-Based Cryogenic Quantum Control Chip



18GHz SSB controller

The Taiwan Semiconductor Research Institute (TSRI) successfully developed Taiwan's first silicon-based cryogenic qubit control chip. Operating in a 4 K environment, the chip delivers highly stable 17.5–18 GHz control signals and integrates I/Q channels, single-sideband modulation (SSB), waveform shaping, and precise timing control.

Supporting 16 qubits with 99.99% fidelity, this achievement marks a significant milestone in Taiwan's quantum computing development. The platform has supported collaborative research among 12 university teams specializing in cryogenic CMOS design, with results published in international journals and presented at major academic conferences.

STPI

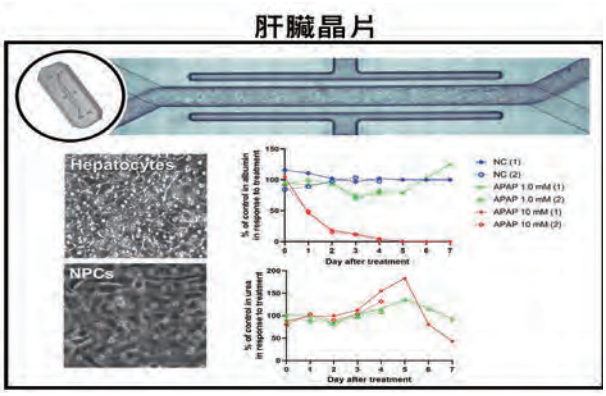
Supporting the NSTC in Refining the National Science and Technology Development Plan — Anchoring Taiwan's Future Technology Roadmap

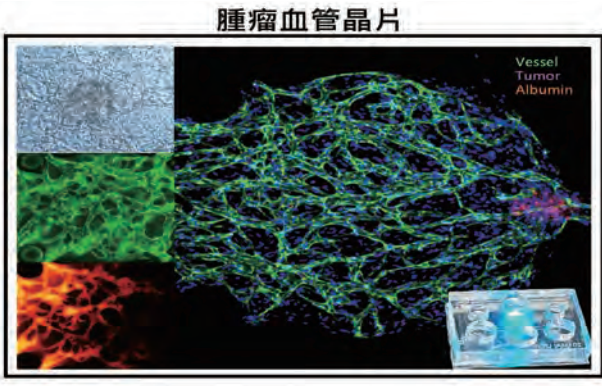
Cover of the National Science and Technology Development Plan.

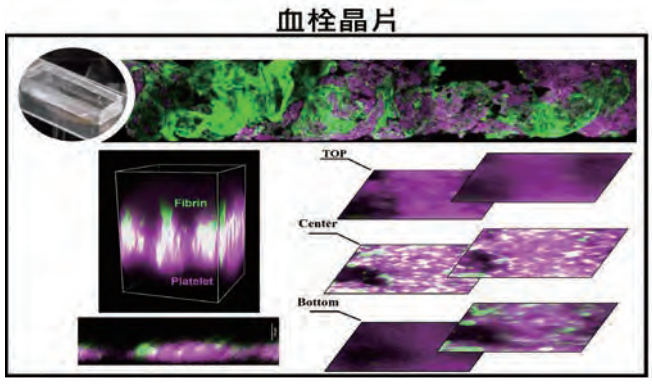
Based on the conclusions of the 12th National Science and Technology Conference, the Science & Technology Policy Research and Information Center (STPI) assisted the National Science and Technology Council (NSTC) in drafting the National Science and Technology Development Plan (2025–2028) . The draft was approved by the Executive Yuan on October 20, 2025. Guided by the vision of " Smart Innovation and Democratic Resilience for a Balanced Taiwan, " the Plan advances future science and technology policies through four main pillars : smart technologies, innovative economic initiatives, balanced growth, and net-zero sustainability. In addition, the Plan aims to respond to the needs of various sectors while strategically positioning Taiwan for future technological development.

NCB

Laboratory for Organ-on-a-Chip Validation Establishes Models for Different Organs







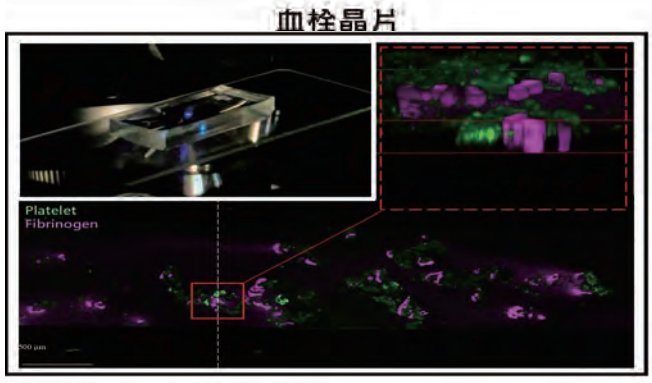


Illustration of different organ-on-a-chip experimental models.

To advance the development of alternative technologies, the National Center for Biomodels (NCB) has established a Laboratory for Organ-on-a-Chip Validation. NCB has successfully developed multiple functional models, including liver toxicity assessment, angiogenesis, tumor angiogenesis, thrombosis and thrombolysis platforms. In addition, advanced domestic and international microphysiological system technologies have been introduced to establish diverse organ-on-a-chip platforms within the laboratory. NCB also provides laboratory facilities and technical services to external collaborators, promoting broader understanding and application of organ-on-a-chip technologies across academia, industry, and research institutions.

NCHC

Nano 5 Supercomputing System, Powers Computing Services for Semiconductor Industry

Group photo of distinguished guests and industry representatives at the Nano 5-Driven Semiconductor Upgrade Showcase.

The supercomputing system, Nano 5, launched a call-for-proposals to strengthen the application of high-performance computing in the semiconductor industry by helping accelerate innovation across chip design, manufacturing, and processes involving packaging, testing, and inspection. This initiative facilitates breakthroughs in terms of lower power consumption, higher energy efficiency, and more diversified applications. Fifteen industry–academia teams achieved innovative outcomes, which span a wide range of fields including generative AI, edge security chips, and photomask optimization. By facilitating innovation throughout the southern Taiwan semiconductor cluster, the Nano 5 has demonstrated that it is a critical component in upgrading Taiwan's semiconductor industry and enhancing overall industrial resilience.

NCHC

The Nano 4 Supercomputer Makes Its Debut — Ranks 29th on the Global TOP500

Nano 4 — the latest supercomputer at NCHC.

Nano 4, which features major upgrades in both performance and architecture, is the latest supercomputer at the National Center for High-performance Computing (NCHC) . The overall system contains 220 H200 nodes, two GB200 NVL72 units, and is equipped with 25 petabytes of storage, 400 Gb/s interconnects, and an energy-efficient liquid cooling system with a PUE of 1.18. Thus, this design delivers higher density and more powerful AI training capabilities. The Nano 4 system participated in the international TOP500 ranking for the first time and came in 29th place. This achievement marks a new milestone in Taiwan's domestically developed high-performance computing capabilities

STPI

iVoice Personalized AI Voice Assistant — Enabling On-the-Go Recording and Effortless Note-Taking

iVoice Personalized AI Voice Assistant System integrates automated summarization technologies with visualization tools such as word clouds and mind maps.

The Science & Technology Policy Research and Information Center (STPI) has launched the iVoice Personalized AI Voice Assistant, which enables users to rapidly transcribe speech, analyze textual content, and engage in real-time interactive dialogue. The team behind iVoice has promoted the development of Taiwan's voice AI industry by creating a domestically developed, legally authorized speech database that features Taiwanese voices. The system provides users with a more personalized and convenient intelligent voice experience by granting access to visualization tools, automatic summarization, data downloads, collaborative review and sharing features for online meetings, and multilingual translation.

TSRI

Development of High-Speed Silicon Photonics Devices — Exceeding the Performance of Commercial Products

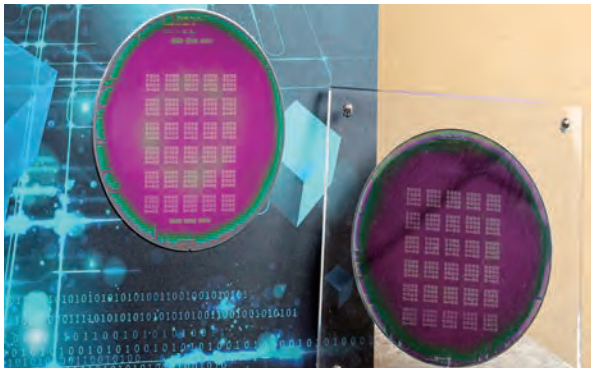
Results from the eye diagram of a 200 Gb/s PAM4 microring modulator.

Researchers at the Taiwan Semiconductor Research Institute achieved a major breakthrough in silicon photonic microring modulators. Through precise RLC circuit design and process optimization, the modulation bandwidth was extended to 90 GHz, enabling 224 Gb/s high-speed transmission in a practical system while maintaining excellent linearity and stability.
This advancement serves as a critical enabler for CPO (Co-Packaged Optics) integration and next-generation high-speed data center infrastructure, further strengthening Taiwan's R&D capabilities and global competitiveness in silicon photonics.

TSRI

Development of Next-Generation High-Density, High-Bandwidth 3D Dynamic Random-Access Memory

Researcher Chih-Chao Yang giving a presentation.



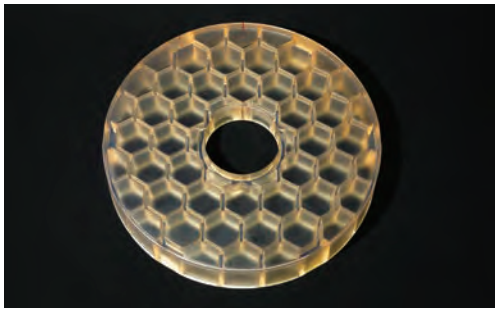
Sample of the memory device.

In response to the growing demand for high-bandwidth, low-power memory in AI chips, the Taiwan Semiconductor Research Institute partnered with Macronix International to develop a next-generation high-density, high-bandwidth 3D DRAM.

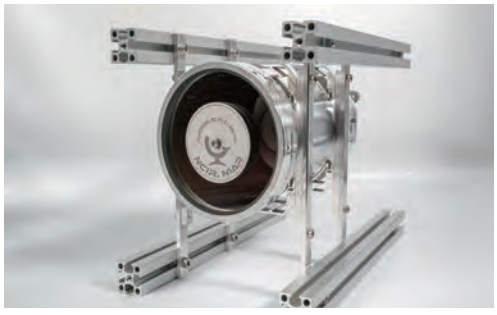
By adopting a capacitor-less architecture and a low-temperature 3D fabrication process, the technology achieves advantages in miniaturization, reduced energy consumption, and enhanced durability. This breakthrough establishes a globally competitive foundation for key High Bandwidth Memory (HBM) technologies in AI applications.

NCIR

Creating Taiwan's Leading National Remote Sensing Team



Primary mirror of the remote sensing optical system for FORMOSAT-8 (FS-8).



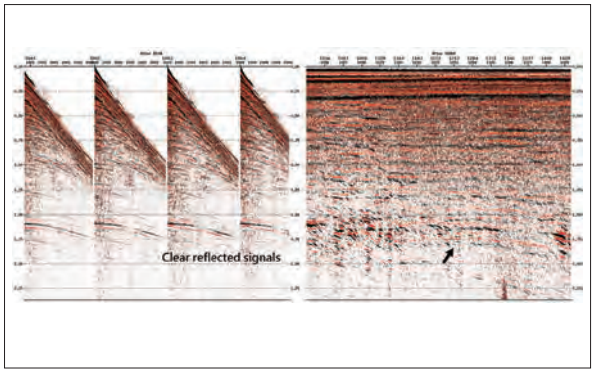
Remote sensing camera for the low-Earth-orbit CubeSat Lilium II.

For more than 50 years, the National Center for Instrumentation Research (NCIR) has been deeply committed to developing optical technologies. In more recent years, NCIR has participated in the development of the optoelectronic remote sensing payloads for FORMOSAT-2 as well as the fabrication of the primary mirror, secondary mirror, and corrective lenses for FORMOSAT-5 (FS-5) . Later, NCIR was responsible for developing and manufacturing the primary and secondary mirrors for FORMOSAT-8 (FS-8) and for completing the design and development of the remote sensing camera for the low-Earth-orbit CubeSat Lilium-2.

TORI

”Deep-structure exploring in shallow sea” — How Much Do We Know About CO_2 Storage?

LMCS equipment in operation at sea.



A processed seismic image that has reached the target depth.

As global warming intensifies, carbon sequestration has become an essential strategy for reducing atmospheric carbon-dioxide levels. Therefore, the Taiwan Ocean Research Institute (TORI) has employed long-offset multichannel seismic (LMCS) equipment and customized experimental parameters for shallow-sea exploration to identify suitable sites for CO_2 storage. Using a pseudo-3D approach, TORI has progressively completed geological surveys for sedimentary structures at a depth of 3 kilometers below seafloor offshore West of Taiwan to evaluate whether CO_2 can be securely and stably retained.

NCIR

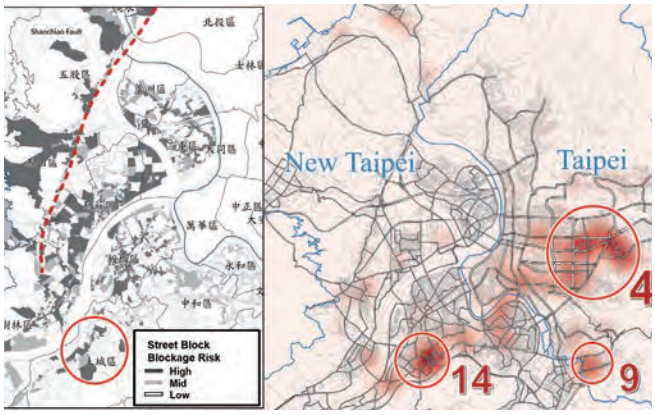
Developing Dedicated Multispectral Remote Sensing System for Hybrid-Powered VTOL UAVs

Multispectral system lenses and sensors.

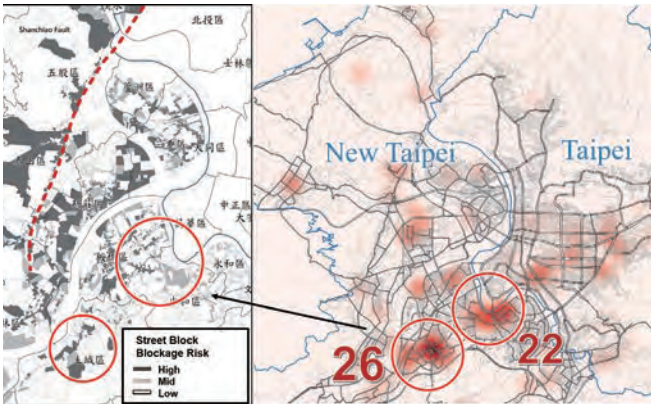
To strengthen Taiwan's independent capabilities in deploying high-altitude UAVs for territorial security monitoring and disaster assessment, the National Center for Instrumentation Research (NCIR) partnered with National Yunlin University of Science and Technology (YunTech) to jointly develop a four-band multispectral instrument. This technological breakthrough, which has been integrated into a hybrid-powered vertical take-off and landing (VTOL) UAV, overcomes the endurance and mission-scale limitations of conventional small battery-powered drones. This development marks an important milestone for Taiwan's domestically developed UAV optical payloads and intelligent remote sensing capabilities.

NCREE

Development of Loss Assessment Technologies for Earthquakes in Taiwan — AI Assistant for Earthquake Disaster Response



Earthquake Risk Map of the Taipei Metropolitan Area and Gas Leak Report Hotspots from the April 3, 2024 earthquake.



Earthquake Risk Map of the Taipei Metropolitan Area and Elevator Incident Report Hotspots from the April 3, 2024 earthquake.

When a major earthquake strikes, the sudden surge of damage information can quickly exceed routine preparedness and response capacity, often causing confusion and operational disruption in the initial stages.

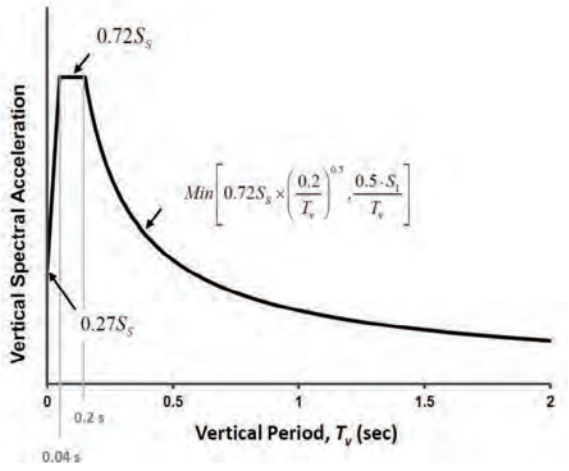
To address this challenge, the National Center for Research on Earthquake Engineering (NCREE) integrates earthquake risk assessment technologies with large language models to develop an artificial intelligence (AI) assistant that supports the rapid identification of damage hotspots and facilitates effective task deployment.

Using data from Taipei City as a case study, NCREE developed a prototype to demonstrate how this approach can consolidate disaster reports, identify hotspots and priority inspection locations, and generate decision-support maps based on existing risk maps.

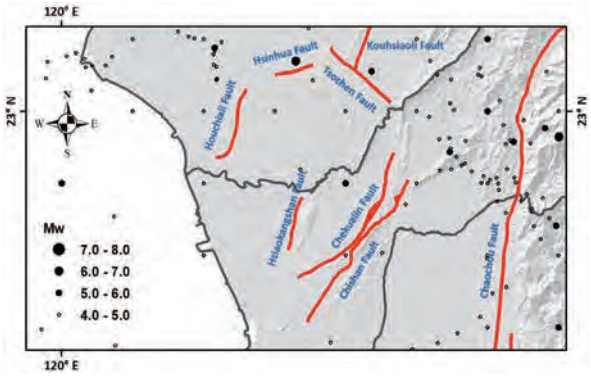
The prototype is designed to enhance situational awareness, accelerate decision-making, and optimize resource allocation during post-earthquake emergency response operations.

NCREE

Research on Seismic Design Codes for Buildings



Revision of Section 2.18 on vertical seismic design forces.



Addition of provisions and corresponding commentary in Section 2.4 concerning the design seismic forces for the Cheguarin Fault.

In 2025, the National Center for Earthquake Engineering (NCREE) completed five proposed revisions to Taiwan's building seismic design codes, including :

(1) Revision of Section 2.18 on vertical seismic design forces.

(2) Addition of provisions and corresponding commentary in Section 2.4 concerning the design seismic forces for the Cheguarin Fault.

(3) Revision of Section 9.5 regarding physical testing and performance verification requirements for seismic isolation components, together with related commentary.

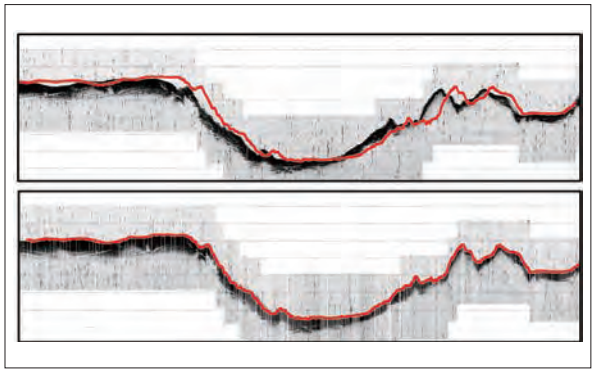
(4) Revisions to Appendix A and Chapter 7 on seismic engineering quality control.

(5) Revision of Appendix B, " Seismic Construction Guidelines for Suspended Lightweight Steel Ceiling Systems. "

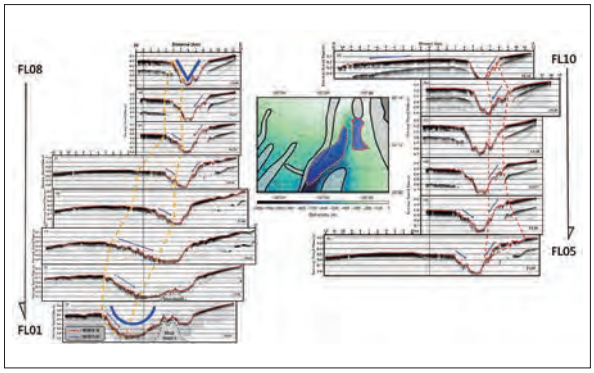
These revisions integrate vertical ground motion data from past damaging earthquakes in Taiwan. Taking into account the period-dependent characteristics of vertical-to-horizontal ground motion ratios observed in actual seismic records, NCREE developed a vertical design response spectrum that reflects the characteristics of vertical seismic motion in Taiwan. This development facilitates the assessment of seismic design demands for long-period structures — such as high-rise buildings and long-span bridges — ensuring adequate structural ductility and displacement control under the design basis earthquakes, thereby reducing the risk of structural damage or collapse. In addition, based on the updated active fault distribution information released by the Geological Survey and Mining Management Agency, new provisions and corresponding commentary have been incorporated to address the design seismic forces associated with the Cheguarin Fault, which has been designated as a Category I active fault. These proposals are currently under consultation with the Ministry of the Interior's National Land Management Agency for subsequent code review, with the aim of progressively enhancing Taiwan's seismic design standards.

TORI

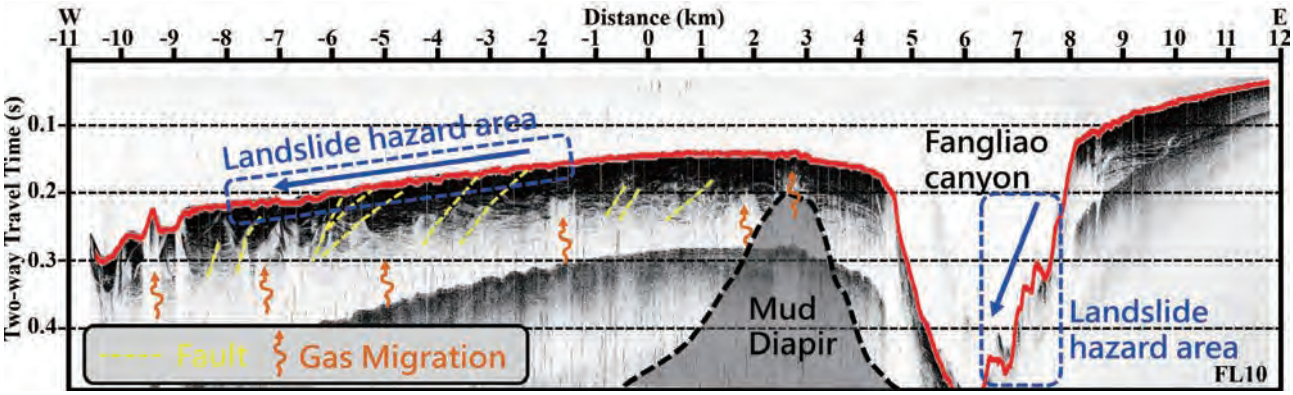
Development Geological Exploration Technologies of Shallow Subsurface — Strengthening Capacities for Seabed Stability Assessments



SBP images before and after geometric positioning processing.



Geological interpretation of corrected SBP images across Fangliao Submarine Canyon.

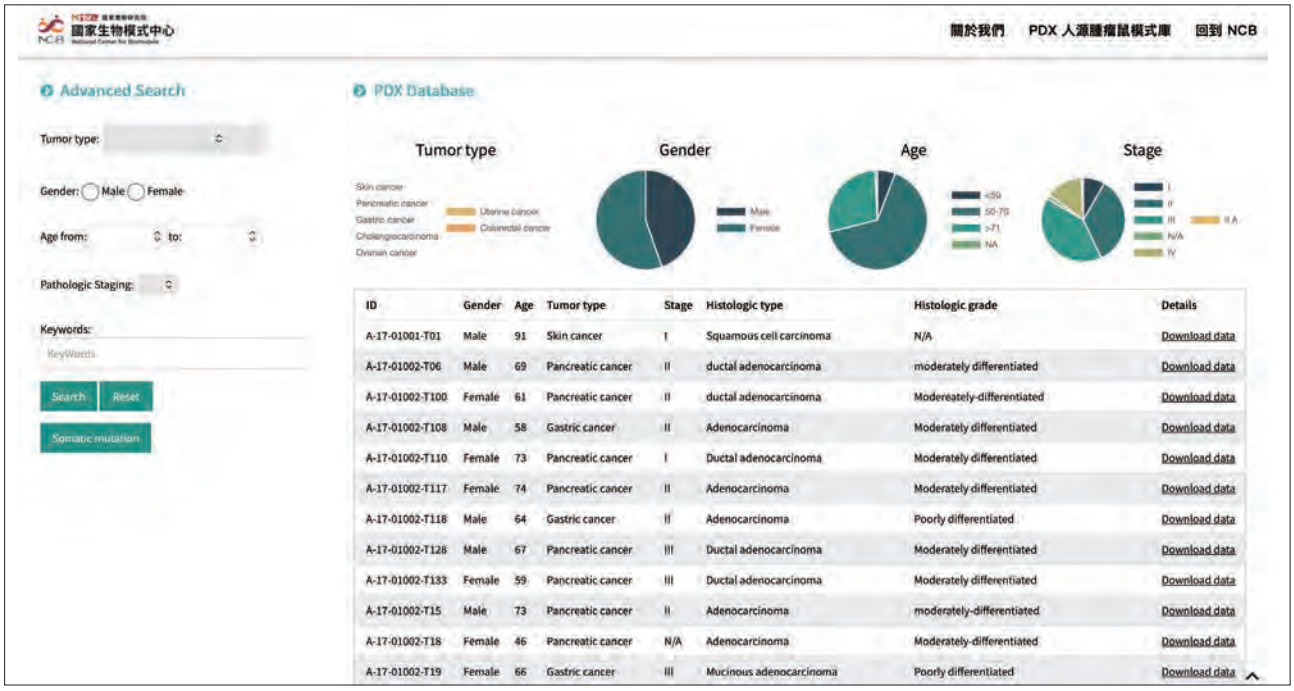


Vulnerable zones of sedimentary structures at Fangliao Submarine Canyon.

Taiwan is located on an active plate boundary and lies within the most seismically active zone. Despite this, demand for offshore construction projects, such as offshore wind farms and ocean-power facilities, has been steadily increasing. Consequently, the Taiwan Ocean Research Institute (TORI) has worked to better understand seabed stability by analyzing sub-bottom profiler (SBP) data collected by the R/V *LEGEND*. TORI has developed a geometric-positioning technique for SBP images, which enables more precise identification of active faults on the seafloor and delineation of vulnerable sedimentary-structure zones. These advancements contribute to safer site selection for future offshore-engineering projects.

NCB

Launch of the Human Tumor Model Database



ID	Gender	Age	Tumor type	Stage	Histologic type	Histologic grade	Details
A-17-01001-T01	Male	91	Skin cancer	I	Squamous cell carcinoma	N/A	Download data
A-17-01002-T06	Male	69	Pancreatic cancer	II	ductal adenocarcinoma	moderately differentiated	Download data
A-17-01002-T100	Female	61	Pancreatic cancer	II	ductal adenocarcinoma	Modereately-differentiated	Download data
A-17-01002-T108	Male	58	Gastric cancer	II	Adenocarcinoma	Moderately differentiated	Download data
A-17-01002-T110	Female	73	Pancreatic cancer	I	Ductal adenocarcinoma	Moderately differentiated	Download data
A-17-01002-T117	Female	74	Pancreatic cancer	II	Adenocarcinoma	Moderately differentiated	Download data
A-17-01002-T118	Male	64	Gastric cancer	II	Adenocarcinoma	Poorly differentiated	Download data
A-17-01002-T128	Male	67	Pancreatic cancer	III	Ductal adenocarcinoma	Moderately differentiated	Download data
A-17-01002-T133	Female	59	Pancreatic cancer	III	Ductal adenocarcinoma	Moderately differentiated	Download data
A-17-01002-T15	Male	73	Pancreatic cancer	II	Adenocarcinoma	moderately-differentiated	Download data
A-17-01002-T18	Female	46	Pancreatic cancer	N/A	Adenocarcinoma	Moderately-differentiated	Download data
A-17-01002-T19	Female	66	Gastric cancer	III	Mucinous adenocarcinoma	Poorly differentiated	Download data

Launch of the website for the Patient-Derived Xenograft (PDX) Model Bank.

The National Center for Biomodels (NCB) has launched a public website for the Patient-Derived Xenograft (PDX) Model Bank, which includes models for colorectal, pancreatic, gastric, ovarian, and endometrial cancers. To date, 116 specimens that have passed quality control are publicly available. The platform integrates an ALOVAS intelligent software co-developed by the National Institute of Applied Research and National Cheng Kung University, enabling interactive browsing of digital pathology images. Somatic mutation datasets generated by whole-exome sequencing (WES) are also available for download. Additionally, NCB offers immunohistochemistry (IHC) services for drug-target protein evaluation. By integrating genetic, proteomic, and pathological information, this platform accelerates drug testing and improves the success rate of translational research.

05

DEVELOPMENT PLANS

Headquarters

Establishment of the Preparatory Office of the National Center for AI Robotics

In August, the National Institutes of Applied Research (NIAR) established the Preparatory Office of the National Center for AI Robotics. The Office is positioned to fulfill three core roles: Technology Integrator, Application Facilitator, and Ecosystem Builder.

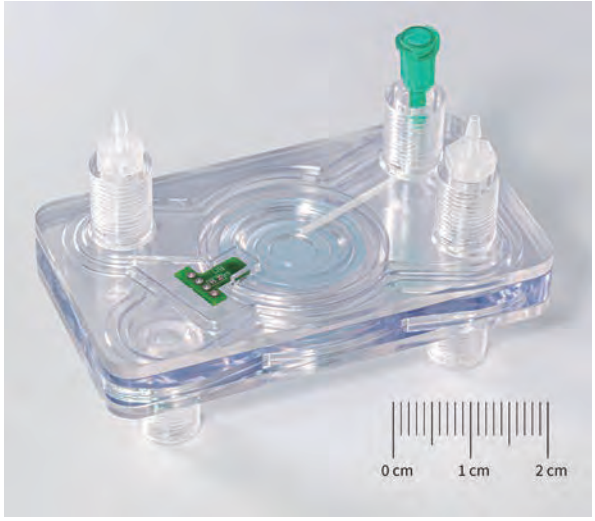
As a Technology Integrator, it integrates Taiwan's dispersed technological capabilities to form a comprehensive robotics development chain. As an Application Facilitator, it works in collaboration with academia and research institutions to introduce robotics technologies into application domains such as healthcare, long-term care, food services, and education. As an Ecosystem Builder, it serves as a bridge between academia and industry, fostering effective alignment between academic innovation and industrial implementation, and accelerating the transformation of technological achievements into tangible products.

AI robotics represents a highly interdisciplinary and cross-industry integrated system, encompassing key modules including cloud computing, data management, perception systems, AI edge computing, human–machine interaction, mechanical design, and motion planning.

Looking ahead, three major technology application platforms will be developed : (1) a collaborative AI robotics platform and testing field ; (2) an advanced AI robotics technology integration and sharing platform; and (3) an AI robotics talent cultivation and hands-on practice platform. The National Center for AI Robotics is scheduled to be formally established in 2026, with the aim of enhancing Taiwan’s capabilities in innovation and practical implementation of AI robotics technologies.

NCIR

Supporting the Establishment of an AI-Enabled Organ-on-a-Chip Surrogate Medical Platform



Development of universal biomimetic modules.

In response to the growing demand for precision health and personalized health prediction, the National Center for Instrumentation Research (NCIR) and the National Center for Biomodels (NCB) have partnerned to establish an AI-enabled organ-on-a-chip surrogate medical platform. The partnership will develop bio-microcirculation control and readout systems that integrate organ-on-a-chip technologies with clinical applications, as well as universal biomimetic modules. Through principles of collaboration, inclusivity, and standardization, the project will advance biomimetic innovation by independently developing *in situ* optoelectronic sensing and microfluidic environmental control technologies.

NCHC

Strengthening the Greater Southern Silicon Valley — Development Plan for the Intelligent Innovation HUB

The National Science and Technology Council (NSTC) has proposed the Greater Southern Silicon Valley Promotion Plan to implement government policy objectives and advance Taiwan as an " AI Island " . Under this initiative, the National Center for High-performance Computing (NCHC) will be responsible for developing digital infrastructure while meeting the growing data and computing power demands of AI applications and planning the deployment of high-performance computing systems. In addition, NCHC will establish the Intelligent Innovation HUB, a smart next-generation energy-efficient data center that is scheduled for completion in 2029. This facility, which will become a key component of Taiwan's AI development infrastructure, will drive industrial innovation and technological applications while accelerating the arrival of the intelligent era.

TORI

Strengthening Eastern Taiwan's Logistical Support — R/V *LEGEND* Initiative Expands Berthing Capacity at Hualien Port

R/V *LEGEND* was docked at Hualien Port.

Protective mooring line were installed by crews to prevent abrasion caused by tidal variation within the harbor.

In alignment with Taiwan's intention to " Competing in Space, Exploring the Oceans " , the Taiwan Ocean Research Institute is advancing the planning and establishment of the " Western Pacific International Observation and Research Station " The R/V *LEGEND* will continue to conduct survey missions off Taiwan's east coast and will use Hualian Port as its eastern home port for maintenance, repairs, and resupply. In addition to enhancing the operational efficiency of survey missions off the east coast, TORI's strategic planning will also lay a solid foundation for long-term scientific research while supporting the expansion of the Research Station's activities. Planning and phased construction have commenced to ensure stable logistical support for survey operations.

NCHC

Preparing for the Development of Quantum Computing Systems

The National Center for High-performance Computing (NCHC) will join the second phase of the National Quantum Team's strategy to create Taiwan's first shared quantum computing infrastructure and promote the research and application of quantum technologies. In addition to constructing the quantum computing system and providing quantum computing services, NCHC will leverage existing high-performance computing resources to establish a hybrid computing architecture that integrates quantum and classical computing. NCHC will also facilitate the application of quantum computing technologies in a diverse array of scientific fields such as materials science, chemistry, and information science. Through these efforts, NCHC aims to lay a strong foundation for future technological competitiveness by cultivating Taiwan's core capabilities in quantum computing.

NCB

Taiwan Alternative Methods Validation Laboratory

Launch of the Taiwan Center for the Validation of Alternative Methods website.

To ensure robustness and transparency in validation, TaiCVAM convenes multidisciplinary experts and establishes mission-driven working groups. These groups are responsible for initial dossier intake and screening, validation oversight and coordination, independent peer review, and recommendations for regulatory harmonization. Through this structured governance and science-based decision-making, TaiCVAM helps ensure that validation activities are conducted transparently, data quality and integrity are maintained, and results are aligned with internationally recognized standards.

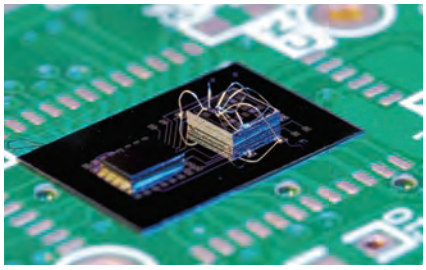
STPI

A New Chapter in AI-Driven Technology Policy Research and Analysis

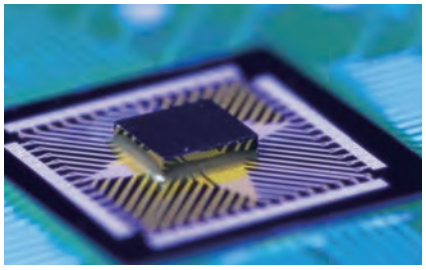
The Science & Technology Policy Research and Information Center (STPI) has continued to develop a knowledge service platform by leveraging artificial intelligence (AI). This platform, which connects to STPI's core databases, has helped researchers rapidly extract key information from a vast corpus of text. In addition, the platform's clear interface and intuitive operating procedures have enabled researchers to generate analytical reports that integrate charts and text according to their needs. Going forward, STPI will explore AI applications in synthesizing expert opinions. This approach will serve as a foundation for cross-disciplinary technology policy discussions, with the aim of opening a new chapter in the discovery of knowledge and the support of sound decisions.

TSRI

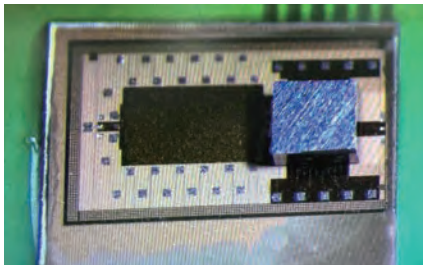
Heterogeneous Integration Platform for Promoting Cross-Domain Chip R&D and Advanced Applications



An integrated circuit for gas sensing.



High-speed ADC.



190 GHz high-frequency circuit.

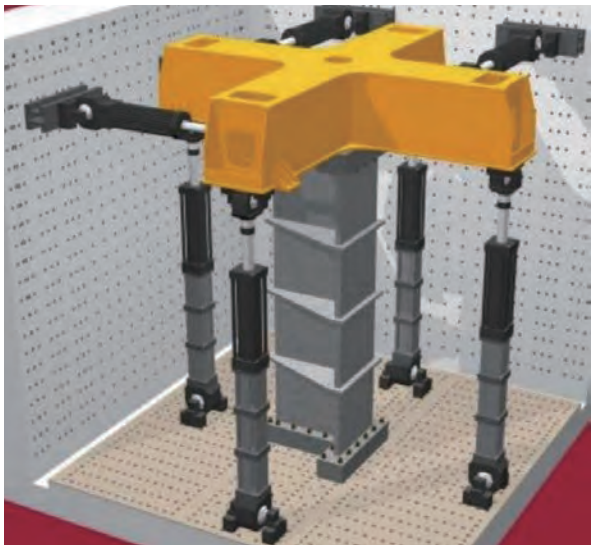
The Heterogeneous Integration Technology Platform involves 17 participating teams, including projects under the Taiwan Chip-Based Industrial Innovation Program, the Key Emerging Technologies Program, and a Taiwan–U.S. collaboration between National Taiwan University (NTU) and the University of California, Davis.

The platform has delivered results in gas sensing, ASIC design, and 190 GHz high-frequency circuits, while continuing cutting-edge research in high-performance chip interconnects, generative AI, optical I/O, silicon photonics, GaN power devices, LiDAR, and intelligent sensing.

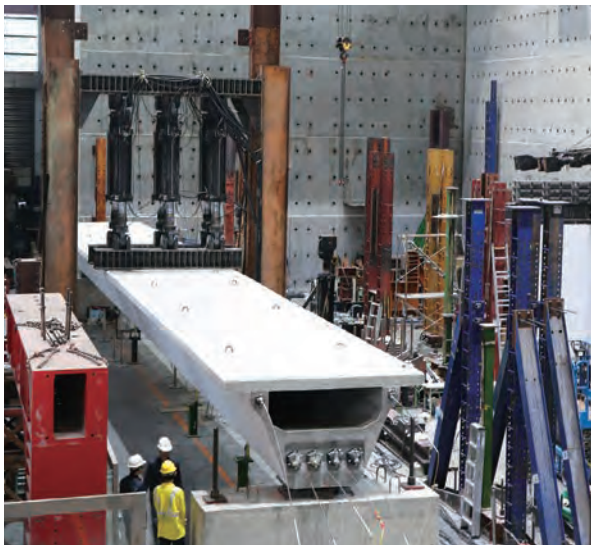
These technologies are being extended to applications such as medical imaging, gesture recognition, and unmanned aerial vehicles (UAVs). Moving forward, the platform will enhance process stability and evaluate the use of silicon carbide and glass substrates to expand its range of applications.

NCREE

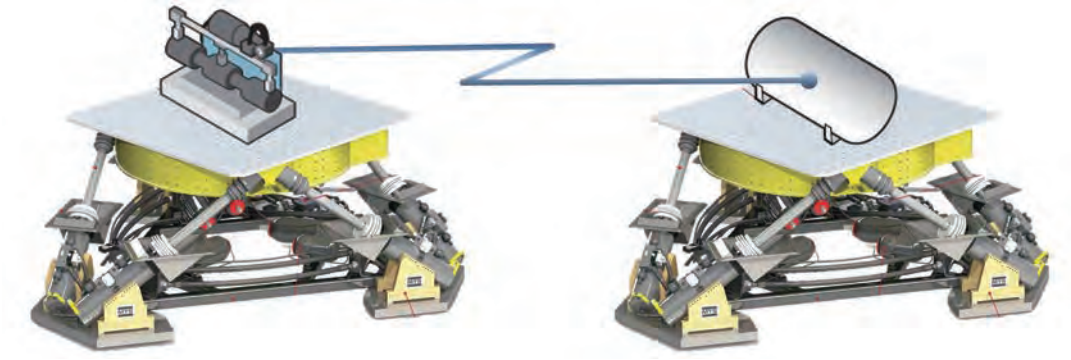
Project for Establishing a Smart Disaster-Prevention Testing Platform for Green Energy Facilities



High-force and long-stroke multi-degree-of-freedom testing system.



Static Loading Test of Ultra-High Performance Concrete (UHPC) Prestressed Simply Supported Beams (U258)



Multi-axis shake table hybrid testing system (Shaking table image source: MTS.)

The Project for Establishing a Smart Disaster-Prevention Testing Platform for Green Energy Facilities includes:

(1) seismic resistance and disaster-prevention research for green energy infrastructure such as hydrogen production, storage, and transportation systems;

(2) the development of low-carbon, carbon-reducing, carbon-negative, and circular construction methods with enhanced seismic resilience;

(3) the establishment of research and testing platforms for green energy facilities.

The project, which will propose standardized inspection and verification procedures, covers seismic performance analysis of critical equipment for hydrogen technologies and green ammonia-to-hydrogen conversion. With a focus on practical applications in structural engineering, the project will integrate key materials and design technologies while establishing testing platforms that strengthen domestic research and development capacity of seismic resilience in green energy and low-carbon technologies.

06

COLLABORATION CONNECTING INDUSTRY, ACADEMIA & RESEARCH

NCHC

Super Computing Alliance Taiwan Established — Jointly Creating a Sovereign Ecosystem for Computing Power

Super Computing Alliance Taiwan held its inaugural meeting on December 12.

The National Center for High-performance Computing (NCHC) formed a strategic alliance to jointly develop Taiwan's computing power ecosystem by bringing together partners across government and industry, including the Ministry of Transportation and Communications' Central Weather Administration, Ubilink.AI, AMD, WiAdvance, NVIDIA, and Foxconn's Visionbay Supercomputing Center. Moving forward, the Alliance will focus on four core areas: computing power coordination and matchmaking, infrastructure resource collaboration, talent cultivation, and open-source software promotion. This new partnership will propel Taiwan into a new era of computing power development by advancing the deployment of key sovereign AI applications, strengthening the resilience of Taiwan's computing power supply chain, and accelerating the growth of related supply chains and ecosystems.

NCB

Passed review by the US Office of Laboratory Animal Welfare (OLAW)

The National Center for Biomodels (NCB) assisted Taiwanese companies in applying for a Foreign Animal Welfare Assurance (FAWA) and acted on their behalf in compliance negotiations with the US National Institutes of Health's Office of Laboratory Animal Welfare (OLAW). By assisting in obtaining this certification, NCB ensured that the animal welfare practices of these Taiwanese companies were fully aligned with international standards. By helping institutions from across academia, industry, and research enter the international system, NCB has strengthened the credibility, visibility, and competitive advantage of Taiwan's research facilities in cross-border collaboration.

TSRI

SLAC, Stanford, NYCU, and TSRI Engage in International Collaboration

Yen-Kai Tzeng, a SLAC/Stanford researcher, poses for a photo with members of TSRI.

During the development and validation of TSMC's T18HVG2 process, the Taiwan Semiconductor Research Institute introduced a photosensing enhancement technology that has been granted patents in both the United States and Taiwan. In 2025, the technology attracted the interest of researchers at SLAC National Accelerator Laboratory, Stanford University, and National Yang Ming Chiao Tung University (NYCU) . Through multilateral collaboration, the partners realized an enhanced photosensing structure and designed circuits with active single-photon cutoff detection capability. Following successful chip tape-out, the collaboration demonstrated the significant technical value and application potential of this innovation.

NCIR

2025 Semiconductor Atomic Level Technology Symposium

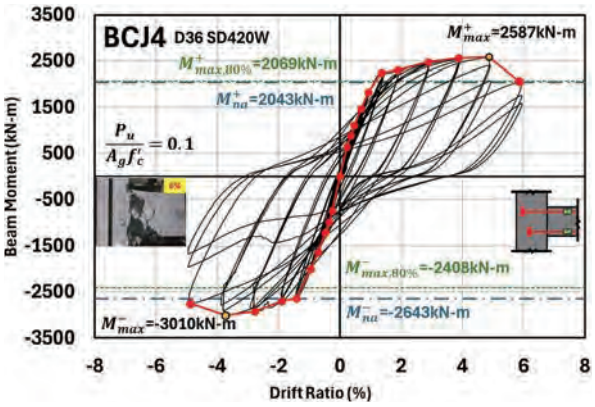
2025 Semiconductor Atomic Level Technology Symposium.

Since 2018, the National Center for Instrumentation Research (NCIR) has organized the Semiconductor Atomic Level Technology Symposium. This symposium has become an important domestic platform for both promoting ALD technology and fostering cross-disciplinary collaboration. In 2025, the Symposium focused on key applications of ALD in semiconductor fabrication and brought together experts from industry, academia, and research institutions to share their latest research achievements and practical experiences. In addition, the Symposium in 2025 aimed to strengthen the development and real-world implementation of ALD technologies while further increasing NCIR's impact in this field both domestically and abroad.

NCREE

Industry–Academia Collaboration between Taiwan and Japan — Experimental Study on the Seismic Performance of RC Components

A new type of welded closed stirrup (designated as Power-Ring by TTK).



Seismic performance test results of RC columns and beam–column joint specimens.

Construction using prefabricated rebar cages with SA-grade mechanical couplers. (Image source: Toong Rong Iron & Steel Enterprise Co., Ltd. (Taiwan)).

The National Center for Research on Earthquake Engineering (NCREE) partnered with Tokyo Tekko Co., Ltd. (Japan) and Toong Rong Iron & Steel Enterprise Co., Ltd. (Taiwan) to conduct material and structural seismic performance testing and validation studies on welded closed stirrups (designated as Power-Ring by TTK), anchorage, and splicing components as well as prefabricated rebar construction methods for reinforced concrete (RC) members. Going forward, this partnership aims to provide these research findings and subsequent recommendations as references for practical applications in engineering design processes and construction detailing.

TORI

TORI Extends Program for Industry–Academia Collaboration with National Taiwan Ocean University

Familiarization and operation of navigation equipment.

Hands-on deck maintenance practice.

Pre-voyage training on life jackets and immersion suits.

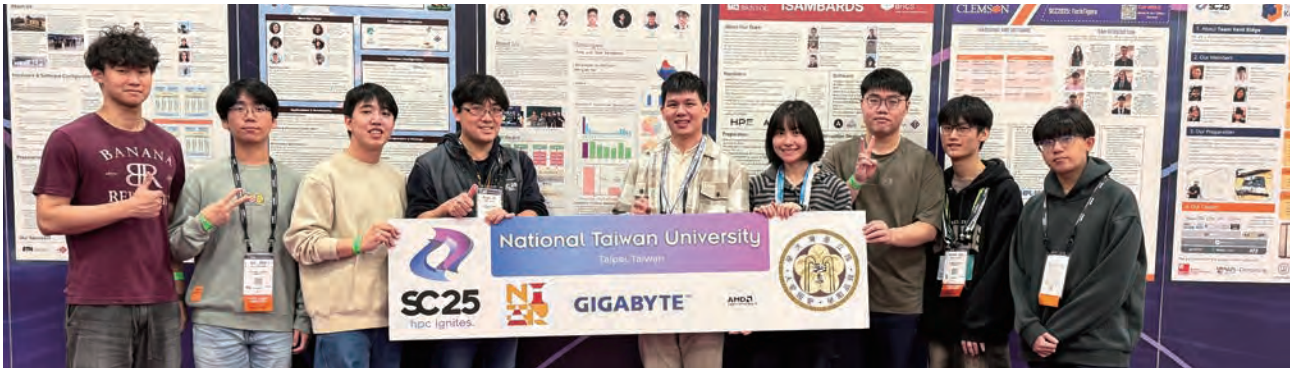
To cultivate future talent and increase impact, the Taiwan Ocean Research Institute (TORI) extended its 2024 industry–academia collaboration program with National Taiwan Ocean University. In the first quarter of 2025, selected students participated in a trial program on the R/V *LEGEND*. This program marked the first time a domestic research vessel hosted marine and engineering undergraduates on board. Hands-on training included deck maintenance, berthing and unberthing operations, and steering practice. This opportunity provided students with an in-depth understanding of the connection between scientific exploration and vessel operations. By experiencing the distinct professional value of opportunities on research vessels over commercial ships, students on this short voyage had the chance to explore different careers in the maritime and shipping sector and bring these insights back to campus.

07

FOSTERING OF SCIENTIFIC AND TECHNOLOGICAL TALENT

NCHC

National Taiwan University Is Overall Winner in International Student Cluster Competition



National Taiwan University Professor Chun Yi Lee (fourth from left) expressing his gratitude to NIAR and industry partners.

With support from the National Center for High-performance Computing (NCHC) , National Taiwan University (NTU) demonstrated Taiwan's strength in HPC education and hands-on implementation by winning the overall championship in its first-ever entry into the Student Cluster Competition (SCC) at the Supercomputing 2025 (SC25) held in St. Louis, USA. For many years, NCHC has cultivated young talent through the " High-Performance Application Competition " (HiPAC) and winter and summer training camps. The NTU team that won the 2025 SCC had accumulated valuable experience by participating in HiPAC as an observing team, which laid a solid foundation for its subsequent success in the international competition.

NCIR

Science Escape Room and Hands-On Smart Sensor Workshop for Taiwanese Girls

A girls-only science escape room adventure that unlocks scientific knowledge through creativity and intelligence.

Learning about logical inference and scientific principles through challenging missions.

In observance of important international holidays such as the International Day of Women and Girls in Science and International Women's Day, the National Center for Instrumentation Research (NCIR) has designed a series of science-themed escape rooms and hands-on smart sensor workshops based on real-life applications. These interactive and engaging activities aim to spark curiosity, cultivate interest, and build confidence in STEM among middle and high school girls.

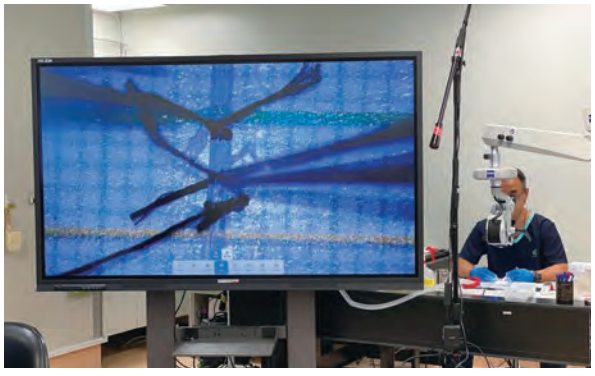
TSRI

TSMC and TSRI Join Forces to CultivateTalent in High Schools

The Taiwan Semiconductor Research Institute (TSRI) partnered with TSMC to launch a semiconductor science outreach camp for high school students. By leveraging TSRI's faculty expertise, laboratory facilities, and industry perspectives, the program provides one of Taiwan's most comprehensive hands-on semiconductor learning experiences. In addition to introducing chip fabrication processes, circuit design, and the broader semiconductor industry landscape, the initiative strengthens students' interest in semiconductor technologies and supports early career exploration. Through industry–academia collaboration, the program contributes to strengthening Taiwan's semiconductor talent pipeline from the grassroots level.

NCB

The World's First Interactive Microsurgery Training Center for Laboratory Animals



An instructor delivering hands-on instruction.

Training activities at the microsurgery training center.

The National Center for Biomodels (NCB) has established an interactive microsurgery training center for laboratory animals based on a "one person, one workstation" training model that integrates realistic simulated clinical scenarios. NCB has significantly enhanced learning efficiency by utilizing a multi-imaging system that overcomes the limitations of traditional demonstration-based teaching. The new center has demonstrated strong integration capabilities and a competitive edge in teaching by providing one-stop training services for middle school and high school students, veterinary interns, medical students, and international exchange students.

STPI

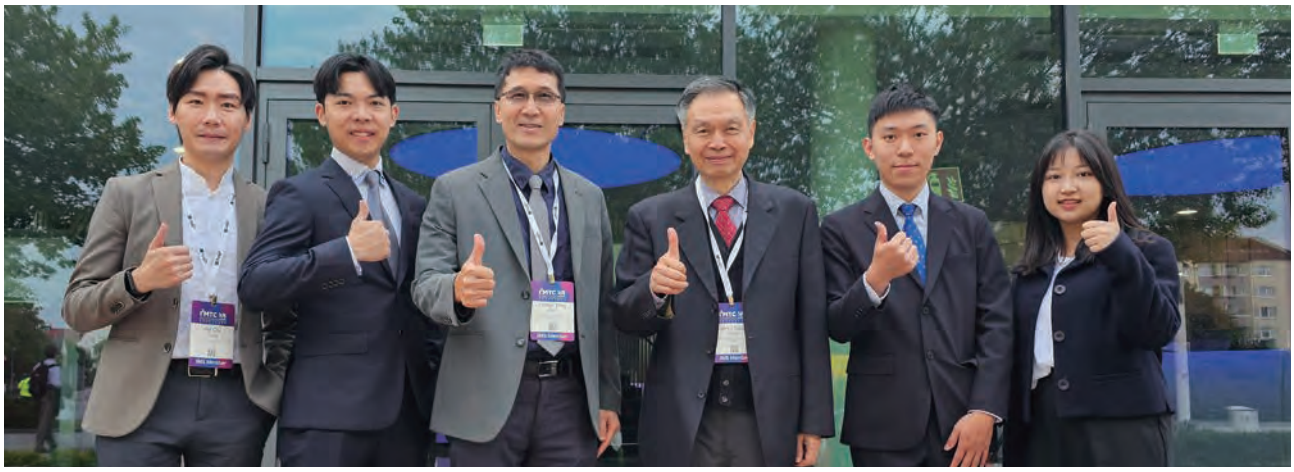
"Win the PRIDE: Telling Stories with Indicators" — A Storytelling Contest Encouraging Young People to Understand Global Trends through Data

Group photo of all distinguished guests in attendance.

Now in its tenth year, the "Win the PRIDE : Telling Stories with Indicators" competition organized by the Science &Technology Policy Research and Information Center (STPI) has received more than 750 submissions, reflecting the growth of young people in data analysis and critical thinking. Going forward, STPI will continue to enhance the PRIDE Policy Research Indicators Database, strengthen the application of indicators, and promote science education through diverse content formats and partnerships. STPI also aims to encourage both the public and young people to view data as a powerful tool for understanding the world.

NCIR

NTHU Team Wins First Prize during the *i*-ONE Competition and Secures Second Place in the IEEE International IMS Student Contest



NCIR Director General Cheng-Tang Pan cheering on the NTHU team during the competition.

The President of the IEEE IMS Society posing for a photo with the award-winning NTHU team.

In 2009, the National Center for Instrumentation Research (NCIR) launched the NIAR *i*-ONE Instrument Technology Innovation Competition. The contest, which has attracted nearly 400 outstanding entries, has helped cultivate a large pool of talent in instrument design and fabrication by encouraging young people to transform ideas into practical applications. During the 17th NIAR *i*-ONE Instrument Technology Innovation Competition in 2025, Chang Gung University won First Prize in the college & above group along with an NT$100,000 award, while National Chia-Yi Industrial Vocational High School secured First Prize in the high school group with an NT$80,000 award. In addition, National Tsing Hua University, which secured First Prize in the college & above group in 2024, represented Taiwan and achieved an impressive second-place finish at the 2025 IEEE International IMS Student Contest in Germany.

NCREE

2025 IDEERS

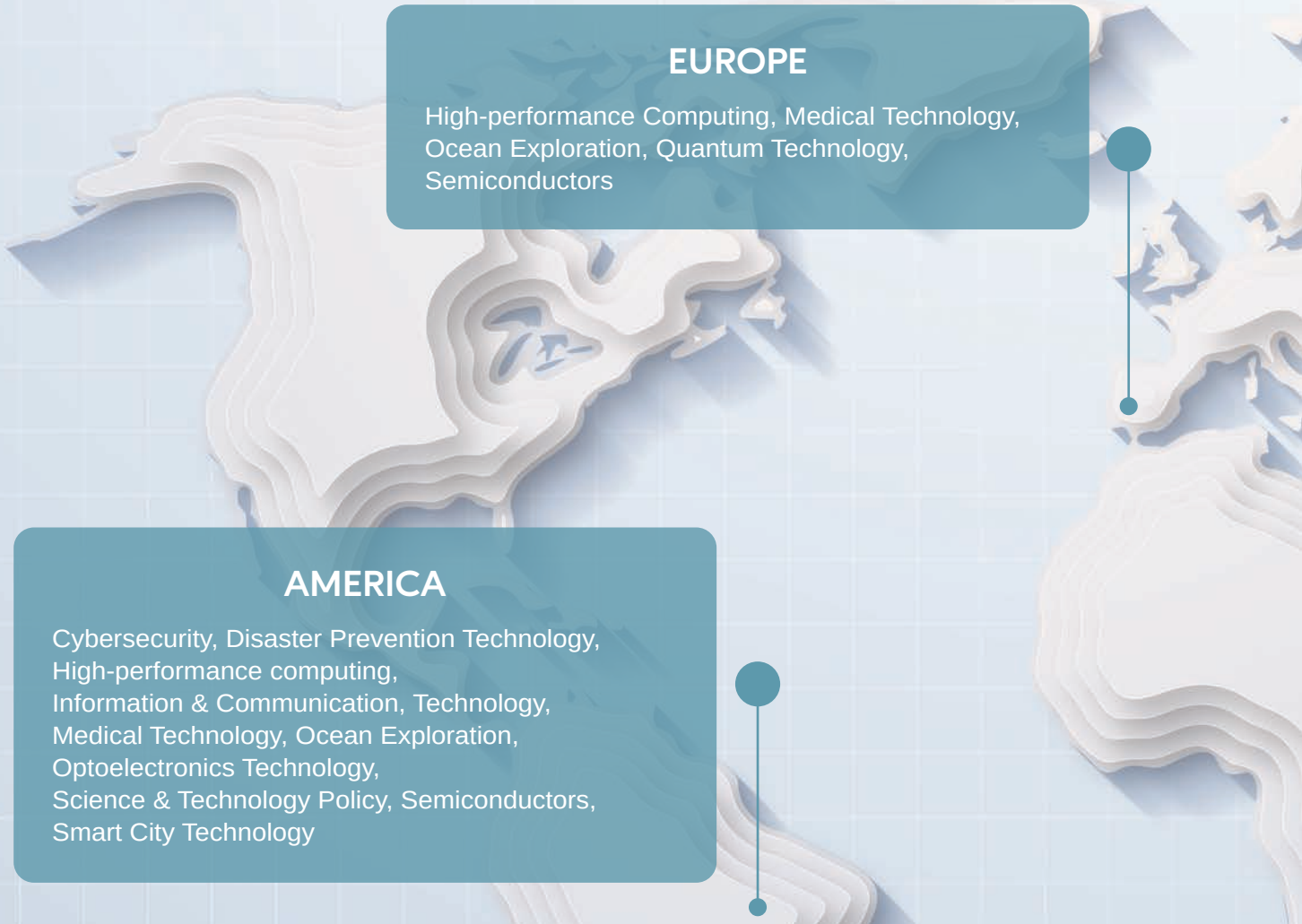
Students demonstrating teamwork and collaboration while assembling models during the IDEERS.

Models preparing to undergo testing after being mounted on the shaking table.

The Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) is one of the most prominent international competitions in earthquake engineering education. This contest aims to foster seismic disaster awareness in young students while encouraging more young people to research earthquake prevention and mitigation. Since its inception in 2001, more than 8,700 students from both domestic and international teams have participated in 20 editions of the IDEERS. In 2025, nearly 400 participants from a total of 98 teams represented countries and regions including Malaysia, Paraguay, Indonesia, South Korea, Vietnam, Singapore, the Philippines, Hong Kong, Thailand, and Australia. Through this competition, NCREE aims to enhance global awareness and the professional capabilities of young Taiwanese people while training the next generation of talent dedicated to creating a safe society.

08

INTERNATIONAL COLLABORATION



EUROPE

High-performance Computing, Medical Technology, Ocean Exploration, Quantum Technology, Semiconductors

AMERICA

Cybersecurity, Disaster Prevention Technology, High-performance computing, Information & Communication, Technology, Medical Technology, Ocean Exploration, Optoelectronics Technology, Science & Technology Policy, Semiconductors, Smart City Technology

Grounded Locally, Expanding Globally

As the pace of globalization increases, NIAR is strengthening international cooperation through joint research programs, personnel exchanges, and talent cultivation. In addition to developing cutting-edge technologies, NIAR is committed to nurturing globally-minded scientific talent by pursuing global excellence while creating local value. By working hand in hand with international partners, NIAR strives to tackle emerging challenges and contribute to sustainable global development.

- International cooperation involving 24 countries
- 156 international cooperative entities
- 145 international cooperation MOUs/Agreements
- 31 international cooperation teams
- 121 published international papers

International Organization

Information & Communication Technology

- ADAC, Accelerated Data Analytics and Computing Institute
- CENTRA, Collaborations to Enable Transnational Cyberinfrastructure Applications
- INFSCI, Inference for Science Services
- PRAGMA, Pacific Rim Applications and Grid Middleware Assembly
- TPC, Trillion Parameter Consortium

Disaster Prevention Technology

- ILEE, International Joint Research Laboratory of Earthquake Engineering

Optoelectronics Technology

- AVS, American Vacuum Society
- ASME, American Society of Mechanical Engineers
- IEEE IMS
- SPIE, International Society for Optics and Photonics

Medical Technology

- AMMRA, Asian Mouse Mutagenesis Resource Association
- AMPC, Asian Mouse Phenotyping Consortium
- IMPC, International Mouse Phenotyping Consortium
- SPARK Global

AMERICA

Cybersecurity, Disaster Prevention Technology, High-performance computing, Information & Communication, Technology, Medical Technology, Ocean Exploration, Optoelectronics Technology, Science & Technology Policy, Semiconductors, Smart City Technology

UNITED STATES

- AITek Incorporation
- ANL, Argonne National Laboratory
- Clarivate Analytics
- Cornell University
- Duke University
- Entegris, Inc.
- iCAIR, International Center for Advanced Internet Research, Northwestern University
- ILEE, International Joint Research Laboratory of Earthquake Engineering
- ITserv Technology
- Lucent
- MIT, Massachusetts Institute of Technology
- Moore Nanotechnology
- NCSA, National Center for Supercomputing Applications
- NCAR, National Center for Atmospheric Research
- NEO Semiconductor, Inc.
- NSF, National Sanitation Foundation
- NVIDIA Corporation
- Stanford University
- SLAC National Accelerator Laboratory
- Telcordia Technologies, Inc.
- PnP, Plug and Play Tech Center
- UCAR, University Corporation for Atmospheric Research
- UCB, University of California, Berkeley
- UC Davis, University of California, Davis
- UH, University of Houston
- UMD, University of Maryland
- UW, University of Washington
- WHOI, Woods Hole Oceanographic Institution
- VU, Vanderbilt University

CANADA

- Carleton University
- Concordia University
- NRC, National Research Council Canada
- UBC, University of British Columbia
- University of Toronto
- WATERLOO. AI, Waterloo Artificial Intelligence Institute
- Mitacs Inc.

EUROPE

High-performance Computing, Medical Technology, Ocean Exploration, Quantum Technology, Semiconductors

BELGIUM

- imec, Interuniversity Microelectronic Centre

CZECH REPUBLIC

- CAS, Czech Academy of Sciences
- CTU, Czech Technical University
- CyberSecurity Hub
- FZU, Institute of Physics of the Czech Academy of Sciences

FINLAND

- CSC, IT Center for Science
- IQM, IQM Quantum Computers

FRANCE

- CEA-Leti, Laboratoire d'électronique des technologies de l'information
- CNRS, Centre national de la recherche scientifique
- Ifremer, Institut français de recherche pour l'exploitation de la mer
- Inalco, Institut National des Langues et Civilisations Orientales
- Inserm, French National Institute of Health and Medical Research
- UPSaclay, Université Paris-Saclay

GERMANY

- Fraunhofer, The Fraunhofer-Gesellschaft
- HLRS, High-Performance Computing Center Stuttgart
- IPP, Max Planck Institute for Plasma Physics
- MARUM, Zentrum für Marine Umweltwissenschaften
- MPI-SP, Max Planck Institute for Security and Privacy
- TUD, Technische Universität Dresden
- University of Tübingen

POLAND

- RGIB, The Main Council of Research Institutes

PORTUGAL

- INESC TEC, Institute for Systems and Computer Engineering, Technology and Science

REPUBLIC OF LITHUANIA

- FTMC, Center for Physical Sciences and Technology

SLOVAK REPUBLIC

- SAS, Slovak Academy of Science

SWITZERLAND

- CERN, the European Organization for Nuclear Research

UNITED KINGDOM

- CISL, Cambridge Institute for Sustainability Leadership
- MRC, Medical Research Council
- NPL, National Physical Laboratory
- University of Edinburgh

ASIA

Artificial Intelligence, Cybersecurity, Disaster Prevention Technology, High-performance computing, Information & Communication Technology, Ocean Exploration

INDIA

- CSIR, Council of Scientific and Industrial Research
- IITG, Indian Institute of Technology Guwahati
- IITK, Indian Institute of Technology Kanpur

INDONESIA

- IEEA, Indonesian Earthquake Engineering Association
- ITB, Institut Teknologi Bandung
- Matana University
- UAJY, Universitas Atma Jaya Yogyakarta
- UNDIP, Universitas Diponegoro
- UNSOED, Universitas Jenderal Soedirman

JAPAN

- AIST, National Institute of Advanced Industrial Science and Technology
- CIEM, Central Institute for Experimental Medicine and Life Science
- DMRC, Disaster Mitigation Research Center of Nagoya University
- ICRR, Institute for Cosmic Ray Research the University of Tokyo
- IRDA, Institute of Resource Development and Analysis in Kumamoto University
- JAEE, Japan Association for Earthquake Engineering
- JAMSTEC, Japan Agency for Marine-Earth Science and Technology
- JST, Japan Science and Technology Agency
- Kyoto University
- Kyushu University
- Nagoya University
- NICT, National Institute of Information and Communications Technology
- NIED, National Research Institute for Earth Science and Disaster Prevention
- NIMS, National Institute for Materials Science
- OIST, Okinawa Institute of Science and Technology
- RIKEN, Institute of Physical and Chemical Research
- SPP Technologies Co., Ltd
- TDK Corporation
- TIT, Tokyo Institute of Technology
- Tohoku University
- Tokyo University of Science

KOREA

- EESK, Earthquake Engineering Society of Korea
- ETRI, Electronics and Telecommunications Research Institute
- KIOST, Korea Institute of Ocean Science & Technology
- KISTEP, Korea Institute of S&T Evaluation and Planning
- KISTI, Korea Institute of Science and Technology Information
- NST, National Research Council of Science and Technology
- SESTEC, Seismic Research and Test Center of Pusan National University
- STEPI, Science and Technology Policy Institute

PHILIPPINES

- ASEP, Association of Structural Engineers of the Philippines
- DLSU, De La Salle University
- SubNet Services Ltd

SINGAPORE

- IME, Institute of Microelectronics
- NSCC, National Supercomputing Centre

THAILAND

- AIT, Asian Institute of Technology
- EARTH, Earthquake Research Center of Thailand
- KMUTT, King Mongkut's University of Technology Thonburi
- MU, Mahidol University
- NSTDA, National Science and Technology Development Agency
- Thai-BISPA, Thai Business Incubators and Science Parks Association
- Thammasat University

ISRAEL

- IOLR, Israel Oceanographic and Limnological Research Ltd.

VIETNAM

- VNU, Vietnam National University
- UTC, University of Transport and Communications

OCEANIA

Artificial Intelligence, Disaster Prevention Technology

AUSTRALIA

- ANFF, Australian National Fabrication Facility
- ANU, Australian National University
- OCSE, Office of the NSW Chief Scientist and Engineer
- UTS, University of Technology Sydney

NEW ZEALAND

- Grayson Engineering Ltd
- QuakeCoRE, Centre for Earthquake Resilience
- UA, University of Auckland
- UC, University of Canterbury

Headquarters

Strengthening Global Scientific Research Collaboration

To continue expanding global scientific research networks, promoting forward-looking technological collaboration, and strengthening international talent exchange, the National Institutes of Applied Research (NIAR) engaged in cooperation with several leading international research institutions in 2025. This cooperation included signing memoranda of understanding (MOUs) and co-hosting multiple international conferences and forums. Through the establishment of MOUs and international exchange mechanisms, NIAR has strengthened its cross-border connections while promoting interdisciplinary collaboration and innovative R&D. In addition, NIAR has supported the government's science diplomacy through technological soft power. NIAR's partners span the Americas, Europe, Asia, and Oceania, and include institutions such as Mitacs (Canada), INSERM, CEA-Leti, and Université Paris-Saclay (France), the Cambridge Institute for Sustainability Leadership (UK), the National Science and Technology Development Agency (Thailand), the National Institute of Information and Communications Technology (Japan), the National Research Council of Science and Technology (Korea), and the Office of the NSW Chief Scientist & Engineer (Australia).

Renewal of the MOU and cooperation agreement with National Science and Technology Development Agency (NSTDA, Thailand)

Organization of a joint workshop with National Institute of Information and Communications Technology. (NICT, Japan)

Renewal of the MOU with CEA-Leti. (France)

Organization of a joint workshop with National Research Council of Science and Technology. (NST, Korea)

TSRI

2025 Taiwan — Europe Chip Innovation Forum

NIAR hosts the Taiwan–Europe Chip Innovation Forum in Germany.

The National Institutes of Applied Research (NIAR) , imec (Belgium) , Europractice, and TU Dresden (Germany) jointly organized the 2025 Taiwan–Europe Chip Innovation Forum (TECIF) , held in Dresden, Germany, on November 27–28.

The forum focused on advanced process technologies, heterogeneous integration, packaging and testing, artificial intelligence, and quantum technologies. By bringing together leading European research institutions and major semiconductor hubs, TECIF served as a transnational platform for semiconductor innovation, accelerating Taiwan–Europe collaboration in scientific research, technology exchange, and talent networking.

TSRI

Taiwan–Czech Joint Semiconductor Research Center

The Taiwan Semiconductor Research Institute (TSRI) and the Czech Technical University in Prague (CTU) jointly established the TSRI–CTU Joint Research Center (JRC) . The center focuses on advanced process technologies, sensing technologies, optoelectronics, and heterogeneous integration.

Through international research projects, faculty exchange, student training, and shared facilities, the TSRI–CTU JRC promotes technological advancement and talent development while integrating European research resources. The initiative aims to build a long-term, stable collaboration platform that accelerates the internationalization and practical application of research outcomes.

NCB

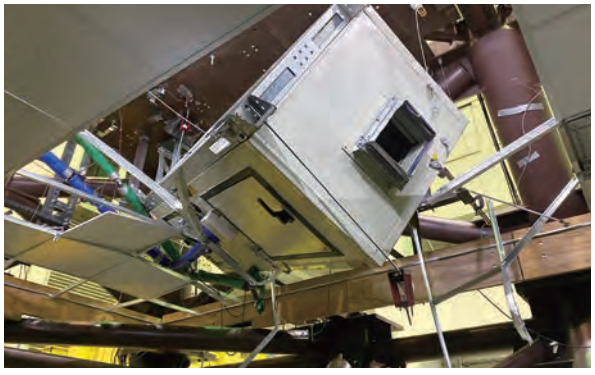
Elected as President of the Asian Federation of Laboratory Animal Science Associations

National Center for Biomodels Director General Hsian-Jean Chin has been elected President of the Asian Mouse Mutagenesis Resource Association (AMMRA) . In this role, she will continue to promote a wide range of partnerships across Asia in areas including animal resources, animal disease models, and alternative in vitro technologies. Director Chin will also promote exchanges between Asian institutions and relevant organizations in Europe and the United States. In addition, she will plan the annual AMMRA meeting in Taiwan in 2026, which will showcase Taiwan's long-term achievements and leadership in this field.

NCREE

NCREE Promotes International Research on Seismic Resilience

Exterior view of the test specimen developed in collaboration with New Zealand universities.



Experiments conducted in collaboration with Japan and Korea confirmed that suspended equipment with inadequate seismic design can pose serious risks to life safety.

To continuously enhance the overall seismic resilience of buildings, the National Center for Research on Earthquake Engineering (NCREE) has promoted international collaborative research by integrating earthquake engineering resources from different countries. In terms of structural systems, NCREE collaborated with the New Zealand Centre for Earthquake Resilience (QuakeCoRE), the University of Canterbury, and the University of Auckland to conduct shake table tests on five-story steel-framed buildings with coupled wall systems. These tests examined the interaction between commonly used reinforced concrete (RC) coupled walls and buckling-restrained braced frames using steel plate shear link braces (SBRB),and evaluated structural responses under different earthquake scenarios. Regarding non-structural systems, NCREE has installed bookshelves, partition walls, and external stone cladding on the five-story structural specimen to investigate the seismic performance of non-structural components and their interaction with the main structure.

In addition, NCREE has collaborated with National Research Institute for Earth Science and Disaster Resilience (NIED) of Japan and Seismic Research and Test Center (SESTEC) of Korea to develop an international testing platform for suspended non-structural systems. This platform enables seismic testing of suspended components such as air-conditioning equipment, ceilings, and fire protection pipelines. The research outcomes are expected to contribute to the revision of seismic design codes and enhance residential safety.

Headquarters

Leveraging Taiwan's Innovative Technologies to Facilitate International Cooperation in Sustainable Scientific Research

NIAR delegation group photo with the ACDRC team of the Taiwan-Czech collaboration.

On June 16, the National Institutes of Applied Research (NIAR) co-hosted the Taiwan–UK Sustainability Research and Development Forum with the Cambridge Institute for Sustainability Leadership (CISL) . The forum brought together members of the Advanced Chip Design Research Center (ACDRC) , a collaborative initiative between Taiwan and Czechia, with the core objective of fostering in-depth dialogue between Asia and Europe. The forum served as a bridge that linked NIAR with the global science and technology ecosystem by focusing on three key themes: net-zero emissions, resilient built environments, and sustainable semiconductors.

STPI

Promoting New Models of International Collaboration — STPI Holds the First Asia-Pacific Biodesign Exchange

To promote regional collaboration and exchange, the Science & Technology Policy Research and Information Center (STPI) initiated the Stanford–Taiwan Biomedical Fellowship Program (STB) . STB, which has supported seed instructors in assisting research institutions and hospitals to launch courses in medical device innovation, also hosted the first Asia-Pacific " Biodesign Innovation Experience Sharing Symposium " in Taiwan. Co-organized and planned in conjunction with Taipei Medical University, National Taiwan University, National Cheng Kung University, and multiple seed instructors from partner universities, STB invited experts from Nagoya, Japan, and Singapore to share their experiences in promoting innovation and commercialization. The STB spin-off startup Brain Navi Biotechnology also shared its practical international experience, which facilitated new opportunities for medical device innovation collaboration across the Asia-Pacific region.

NCHC

HPC Asia 2025

Group photo of participants at HPC Asia 2025.

The National Center for High-performance Computing (NCHC) hosted HPC Asia 2025 with the theme " Chip-Driven Exploration and Innovation for HPC. " The event gathered more than 200 international experts in Hsinchu to exchange insights on emerging trends in high-performance computing and chip technologies. The conference also expanded international research collaboration by linking up with the AI-NWP International Workshop and CENTRA 2025. The event, which brought together leading global research institutions and companies to showcase cutting-edge technologies, also featured student presentations highlighting their achievements at the High Performance Application Competition (HiPAC) . By hosting HPC Asia, NCHC demonstrated its role in strengthening international partnerships and enhancing Taiwan's impact within the global HPC community.

NCIR

Taiwan's First Automated Stem Cell Cultivation System

The Cyto Chamber was jointly developed by NCIR and NYCU.

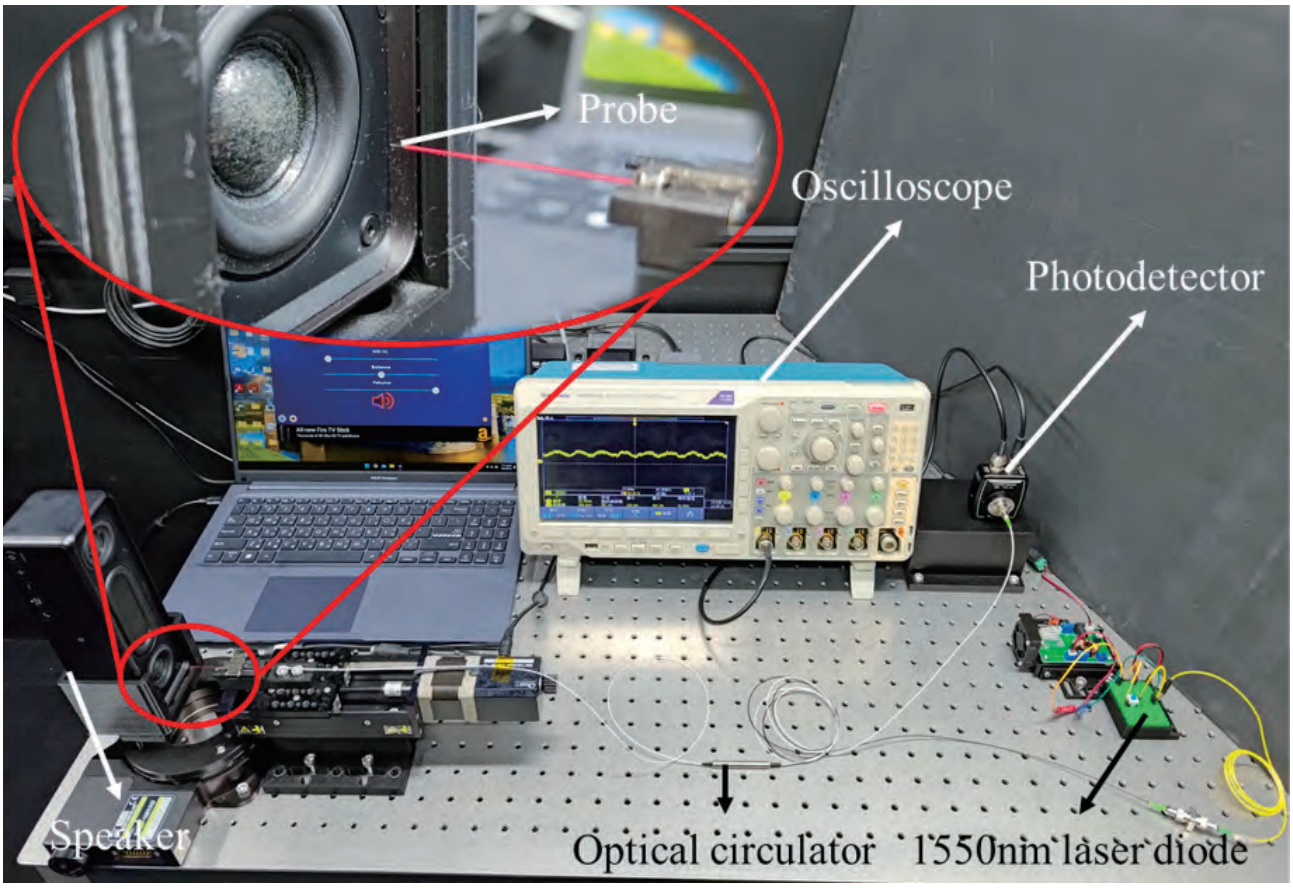
A joint team of researchers from National Yang Ming Chiao Tung University (NYCU) and the CiRA Foundation of Kyoto University, Japan recently achieved a major breakthrough in regenerative medicine. After five years of collaboration, the NYCU–CiRA team developed the Cyto Chamber, the world's first automated system for stem cell cultivation and differentiation. The National Center for Instrumentation Research (NCIR) and NYCU jointly developed the core components of the Cyto Chamber. NCIR also played a critical role in opto-mechatronic integration, systems engineering, and precision control. These technologies have enabled the full automation of processes that previously relied heavily on manual labor, including cell culture, medium exchange, passaging, and environmental control. The Cyto Chamber has laid the foundation for large-scale stem cell production and the industrialization of regenerative medicine by significantly improving efficiency, quality, and stability.

09

SOCIAL ENGAGEMENT

NCIR

NYCU, Cheng Hsin General Hospital, and NCIR Jointly Develop a Novel Miniaturized Fiber-Optic Microphone



The sound pressure testing system used in this study.

National Yang Ming Chiao Tung University (NYCU), Cheng Hsin General Hospital, and the National Center for Instrumentation Research (NCIR) jointly developed a "miniaturized Fabry–Pérot fiber-optic microphone." The team overcame issues related to magnetic field interference that affects conventional microphones. The team's findings were published in *Optics & Laser Technology*. Comparable in size to a strand of hair, this micrometer-scale microphone features a simple structure, low price point, and stable signal. The microphone's sensitivity has improved by approximately 37%, enabling detection of more subtle and higher-frequency sounds. The device, which is suitable for wearable electronics, hearing aids, and cochlear implants, has demonstrated strong commercial potential for being able to improve the quality of life for people with hearing impairments.

Headquarters

NIAR Science Outreach Programs

Long-term science outreach exhibitions organized by NIAR across Northern, Central, and Southern Taiwan.

The National Institutes of Applied Research (NIAR) partnered with science education centers and libraries in Taipei, Taichung, and Kaohsiung to host long-term popular science exhibits. In Taipei, NIAR worked with the Taiwan Space Agency and the National Taiwan Science Education Center (NTSEC) to hold the Secret Bases of Scientists exhibition in the fan-shaped gallery on the 8th floor of NTSEC. In Taichung, NIAR collaborated with the National Library of Public Information to present Secret Base of Scientists@Taichung in the micro-exhibition area on the second floor. In Kaohsiung, NIAR partnered with the Taiwan Space Agency and the National Science and Technology Museum to host the special exhibition Taiwan's Technological Treasures–Secret Bases of Scientists 2.0 in a corridor on the museum's sixth floor. The three exhibitions, which attracted more than 260,000 visitors in 2025, had a significant impact on promoting science education.

NCB

Developing 3R Teaching Programs for Middle and High School Biology Classes

Students practicing embryo washing and selection techniques without using a microscope.

The National Center for Biomodels (NCB) upholds the principle of not using live vertebrates in experiments. Guided by this principle, NCB designed hands-on courses that integrate forward-looking biotechnology into the 3Rs framework. These courses, which align with the inquiry-based spirit of Taiwan's 2019 Curriculum Guidelines of 12-year Basic Education, include fish embryo blood-flow observation, genetic trait analysis, and simulated embryo manipulation. These NCB courses promote interest in life sciences by leveraging innovative alternative technologies to teach students about meaningful concepts and scientific ethics. Therefore, NCB has organized workshops with public high schools to ensure the safety and feasibility of these courses by adapting content to the laboratory specifications of individual campuses. These approaches have enabled innovative teaching practices to be effectively implemented while promoting long-term student interest in life sciences.

NCHC

Developing an AI Model and Application Service Platform for the Tsou Language

The National Center for High-performance Computing (NCHC) has applied generative AI to the preservation of Indigenous languages and cultures. Following its work on the Truku language, NCHC has input a corpus of more than 71,000 sentences and 240 hours of audio into its newly launched AI service platform for the Tsou language. The platform's dataset is five to thirteen times larger than comparable domestic datasets. NCHC has also developed Taiwan's first AI model for the Tsou language, covering speech synthesis, speech recognition, and bidirectional translation. These three functions can be applied to Tsou-language chatbot services. In addition, NCHC has supported the launch of an Indigenous language learning platform and a professional development system for teachers. These two platforms, which together have accumulated over 1.25 million visits, have advanced the preservation and dissemination of Indigenous culture and language.

NCREE

Assisting in the Seismic Retrofit of High-Risk Private Buildings

On-site briefing session on October 3.

NCREE Director General Yu-Chen Ou delivering remarks during the on-site showcase.

The Office of Retrofitting in Stages for Private Buildings under the National Center for Research on Earthquake Engineering (NCREE) held an on-site observation event in New Taipei City to showcase a seismic reinforcement project involving a building in Tucheng District that was severely damaged during the 2024 Hualien earthquake.

This project facilitated the retrofit of the first building in New Taipei City classified under the Red/Yellow Tagged Buildings assessment system, underscoring its strong symbolic significance. The event functioned as an important platform for promoting seismic retrofitting and strengthening public awareness of earthquake safety.

NCHC

Development and Application of Multidimensional GIS Digital Twin Technology

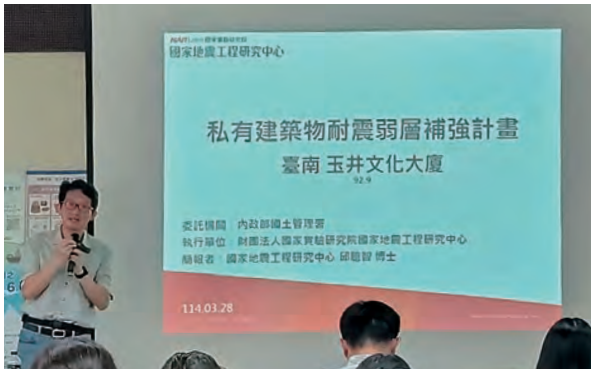
The National Center for High-performance Computing (NCHC) has developed digital twin technologies to support multidimensional geographic information systems (GIS) that can be applied to public engineering safety monitoring and smart planning. In this regard, NCHC's efforts have also included assisting the Miaoli County Government in establishing a Simulation System for Smart Urban Planning. This system has enhanced the precision and efficiency of urban planning by integrating two-dimensional maps, building information, and evacuation routes. NCHC has also supported the MOEA's Central Geological Survey and Mining Management Agency in establishing a management system for explosives depots in mining areas. In addition, NCHC has assisted the Taichung City Government in creating a three-dimensional safety platform for the construction of the Taichung Dome. This platform has strengthened site visualization and construction safety management by integrating Building Information Modeling (BIM) and virtual reality (VR) technologies.

NCREE

Disaster Assessment and Emergency Response for the January 21 Nansi Earthquake

NCREE accompanying officials during the damage inspection.

NCREE attending the press conference on recovery initiatives related to the January 21 Nansi Earthquake.



NCREE participating in a community briefing session at a residential building in Yujing District, Tainan.

On January 21, 2025, the Nansi Earthquake (magnitude 6.4) struck Dapu Township, Chiayi County, causing damage to numerous residential buildings. The National Center for Research on Earthquake Engineering (NCREE) accompanied Premier Cho Jung-tai and National Land Management Agency Deputy Director-General Hsu Yen-Hsing to the disaster area to assess the damage. On January 25, NCREE accompanied President Lai Ching-te to inspect the affected areas. After inspecting a residential building in Yujing District and identifying seismic safety concerns associated with a soft-story deficiency, NCREE promptly activated an advisory mechanism to assist residents in accelerating the seismic retrofit of the building's vulnerable ground floor.

10

MILESTONES

2025

1 JAN.

/ 07

NLAC

Thrombosis-on-a-Chip wins a 2025 CES Innovation Award.

>>

2 FEB.

/ 25

TSRI

Partnership with Macronix develops the world's first capacitor-free 3D DRAM ; IGZO technology enhances AI memory performance.

>>

3 MAR.

/ 06

Headquarters

NARLabs signs a Memorandum of Understanding (MOU) with Mitacs (Canada).

/ 11

NLAC

Press conference for the world's first interactive education center for laboratory animal microsurgery.

/ 15

TIRI

TIRI co-organizes the NARLabs Smart Machinery Competition with ASME Taiwan Section ; team from National Tsing Hua University wins first place.

/ 16

TORI

Groundbreaking ceremony for the Heavy-Duty Ocean Scientific Instrumentation R&D and Manufacturing Base.

3 MAR.

/ 18

TORI

Unveiling of TORI's dedicated CTD deployment and recovery system.

/ 18

NCREE

NCREE assists Kaohsiung City in establishing the 5D Digital Twin Smart City Public Works Management and Decision Support Platform, which wins a 2025 Smart City Innovation Application Award.

/ 25

Headquarters

NARLabs officially changes its English name to the NATIONAL INSTITUTES OF APPLIED RESEARCH (NIAR) ; National Laboratory Animal Center (NLAC) renamed as National Center for Biomodels (NCB) ; Taiwan Instrument Research Institute (TIRI) renamed as National Center for Instrumentation Research (NCIR).

>>

4 APR.

/ 01

NCHC

Launch of the generative AI development platform TAIWAN AI RAP.

/ 07

Headquarters

NIAR and Inserm (France) co-host the Taiwan-France Organs-on-Chips Science Forum in France.

/ 10

Headquarters

NIAR renews the MOU with CEA-Leti (France).

/ 30

STPI

STPI establishes Seven Core Resource Platforms to enhance integrated research services.

/ 30

NCREE

NCREE signs an MOU with the Disaster Mitigation Research Center, Nagoya University (Japan).

6 JUN.

/ 16

Headquarters

NIAR and the Cambridge Institute for Sustainability Leadership (CISL) co-host the "UK–Taiwan Sustainability Research & Development Forum" in UK.

/ 24

NCIR

Press conference for a research breakthrough made between NCIR and DEUVtek : " Laser Grinding Technology to Improve SiC Wafer Productivity and Process Efficiency "

/ 25

STPI

STPI holds the first batch of the 2025 FITI final selection and award ceremony.

>>

7 JUL.

/ 01

TSRI

Launch of a semiconductor outreach camp for high school students with TSMC ; 4,800 students trained over three years.

/ 17

Headquarters

NIAR and Japan's National Institute of Information and Communications Technology (NICT) co-organize the NIAR-NICT Joint Workshop in Taiwan.

/ 25

STPI

STPI hosts the 2025 SPARK Asia Showcase, bringing together 13 biopharma and medical device teams from Taiwan, Japan, Korea, Australia, and Germany to promote international collaboration and technology matching.

>>

8 AUG.

/ 01

Headquarters

Inauguration of the Preparatory Office of the National Center for AI Robotics.

/ 12

NCREE

NCREE releases the Advanced Earthquake Early Warning System for Floor Vibration of High-Rise Buildings.

9 SEP.

/ 13

TSRI

Establishment of the Silicon Photonics CPO Platform to accelerate AI chip validation with international support.

/ 18

NCB

NCB Director General Hsian-Jean Chin elected President of AMMRA.

>>

10 OCT.

/ 01

TSRI

Professor Chien-Nan Jimmy Liu of NYCU appointed Director General of TSRI.

/ 14

TSRI

Launch of the 7 nm design environment and EDA Cloud 2.0 ; first 7 nm chip taped out by academia.

/ 16

Headquarters

NIAR and NSTDA (Thailand) renewed the MOU and hold a joint workshop.

/ 18

NCIR

17th NIAR *i*-ONE Instrument Technology Innovation Competition : First Prizes awarded to Chang Gung University and National Chia-Yi Industrial Vocational High School

/ 20

NCREE

NIAR signs MOUs with Concordia University and Carleton University (Canada).

/ 28

Headquarters

NIAR and NST (Korea) co-host the 7th bilateral symposium in Korea.

11 NOV.

/ 06

Headquarters

NIAR signs an MOU with Université Paris-Saclay (France).

/ 07

NCHC

Nano 4 supercomputing system ranks 29th globally.

/ 26

STPI

STPI holds the second batch of the 2025 FITI final selection and award ceremony.

12 DEC.

/ 12

NCHC

President Lai Ching-te officiates the launch of the NCHC Cloud Computing Center; Super Computing Alliance Taiwan established the same day.

/ 19

TSRI

Taiwan Silicon Photonics CPO–AI Ecosystem Forum held.

>>

2026

11

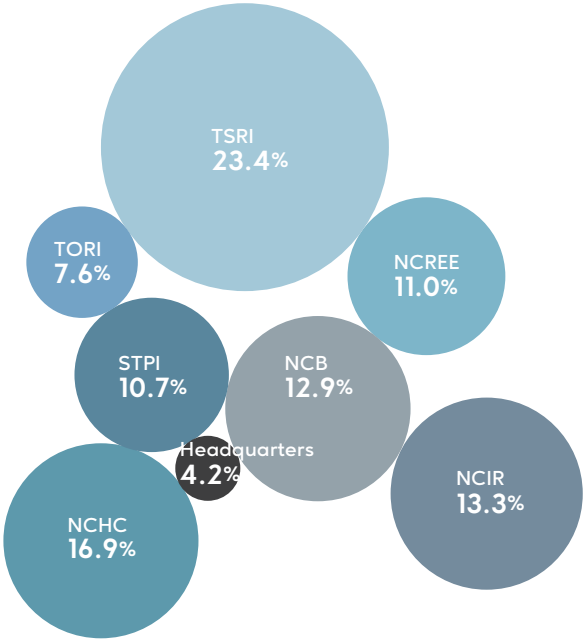
ANNUAL PROFILE

HUMAN RESOURCES

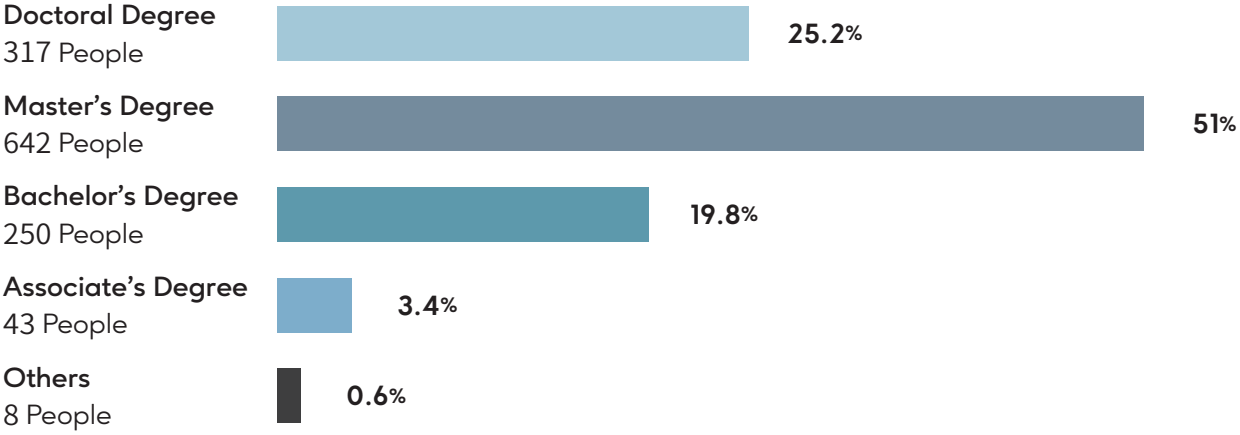
Number of Employees in Laboratories

1,260 Employees

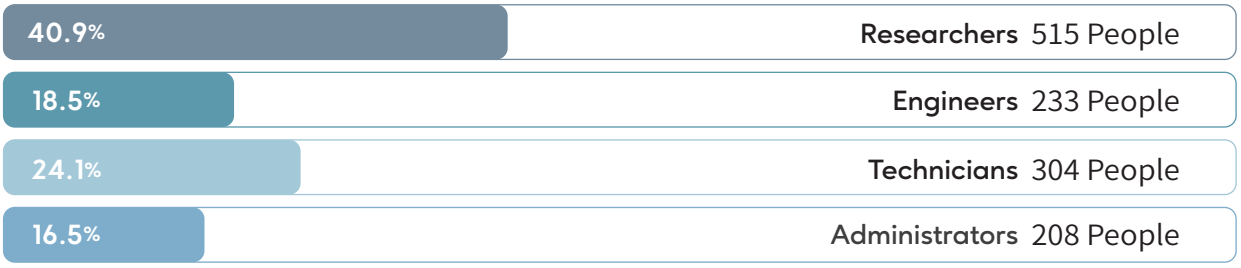
Headquarters	53 People
TORI	96 People
STPI	135 People
NCREE	138 People
NCB	162 People
NCIR	168 People
NCHC	213 People
TSRI	295 People



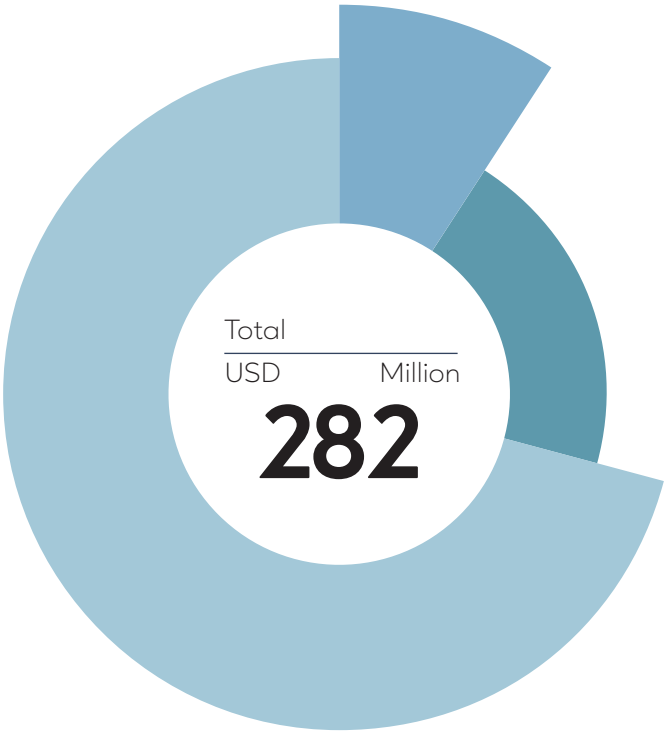
Education Level



Human Resources Profile



FINANCIAL INFORMATION



71%
Grants

20%
Fund Raised from Government Agencies

9%
Fund Raised from Private Sector

TSRI	USD **84** Million
NCHC	USD **78** Million
STPI	USD **27** Million
NCIR	USD **24** Million
NCREE	USD **21** Million
NCB	USD **18** Million
Headquarters	USD **17** Million
TORI	USD **13** Million

ORGANIZATION

Board of Directors & Supervisors

Chairperson	Cheng-Wen Wu
Managing Director	Mei-Yin Chou, Pei-ling Liu, Zsehong Tsai, Wen-Chang Chen
Directors	Charles Hsu, Kuo-Fong Ma, Yi-Chun Wu, Chi-Hung Lin Chih-Peng Li, Hahn-Ming Lee, Emily Hong, Chih-Lin Hu
Executive Supervisors	Yu-Yen Liao
Supervisors	Chan-Jane Lin, Cheng-Chih Wu
Auditing Office / Director	Kuo-Jui Hsiao

President's Office

President	Hung-Yin Tsai
Vice President	Chun-Liang Lin
Secretary General Chief	Chia-Sung Chiu
Chief Operating Officer	Yu-Hsueh Hsu

Headquarters / Directors

Strategy & Planning Office	Shu-Chen Lin
Operation & Promotion Office	Lung-Yao Chang
International Affairs Office	Melissa Chen
Administration Office	Chi-Nung Yin
Finance & Accounting Office	Min Huang
Human Resources Office	Tai-Hsiang Wang
Information Technology Service Office	Steven Shiau (Acting)

Laboratories / Director Generals

National Center for Biomodels (NCB)	Hsian-Jean Chin
National Center for Research on Earthquake Engineering (NCREE)	Yu-Chen Ou
National Center for High-performance Computing (NCHC)	Chau-Lyan Chang
Taiwan Semiconductor Research Institute (TSRI)	Chien-Nan (Jimmy) Liu
National Center for Instrumentation Research (NCIR)	Cheng-Tang Pan
Science & Technology Policy Research and Information Center (STPI)	Chun-Liang Lin (Acting)
Taiwan Ocean Research Institute (TORI)	Te-Yu Liao
Prep. Office of NCAIR	Alvin W. Y. Su

LOCATIONS

Headquarters

Taipei

NIAR Headquarter

National Center for Biomodels

National Center for Research on Earthquake Engineering

Science & Technology Policy Research and Information Center

Hsinchu

National Center for High-performance Computing

Taiwan Semiconductor Research Institute

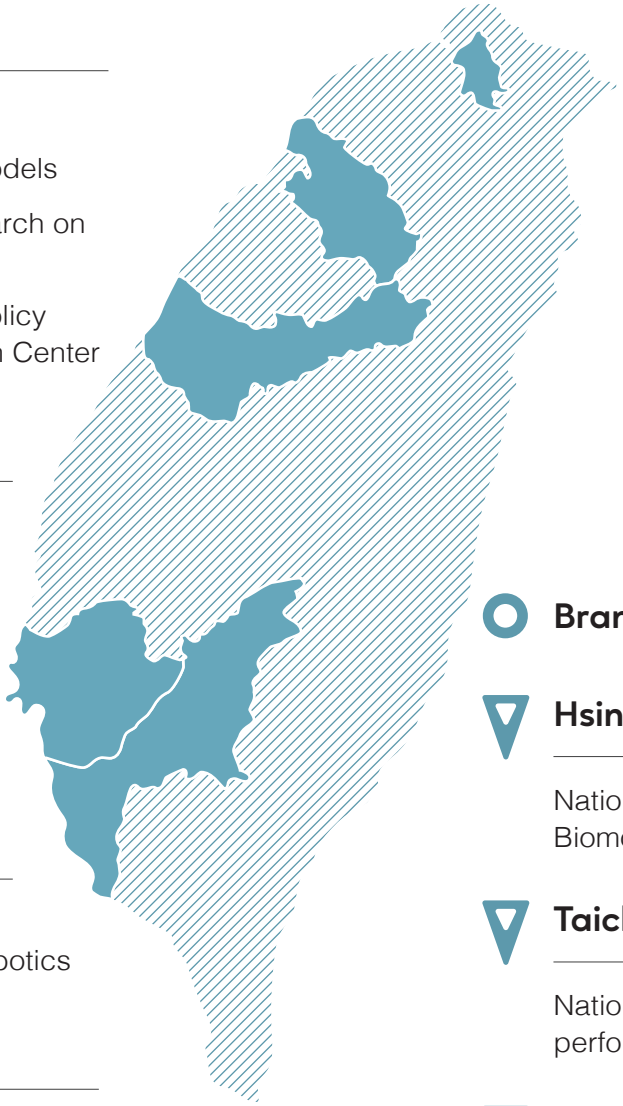
National Center for Instrumentation Research

Tainan

Preparatory Office of the National Center for AI Robotics

Kaohsiung

Taiwan Ocean Research Institute



Branches

Hsinchu

National Center for Biomodels

Taichung

National Center for High-performance Computing

Tainan

National Center for Biomodels

National Center for Research on Earthquake Engineering

National Center for High-performance Computing

Taiwan Semiconductor Research Institute

12

OUR LABORATORIES

NCB

National Center for Biomodels

The National Center for Biomodels (NCB) supports basic research throughout Taiwan by providing laboratory animals at various specific pathogen–free (SPF) levels as well as hard and core technologies. In addition, NCB also enhances facilities for animal testing while expanding capacity in areas such as efficacy validation for new drugs, advanced surgical devices, and gut microbiota research platforms. NCB is also committed to developing animal testing methods and alternative testing approaches in tandem. By utilizing human-derived tissues, NCB helps develop surrogate medical systems while advancing organ-on-a-chip and other alternative solutions through integrating microfluidics, biomedical sensing, and three-dimensional cell culture technologies. In addition, NCB enhances workforce competencies and technical expertise by offering professional training programs for laboratory veterinarians, technical staff, animal care personnel, and facility managers.

NCREE

National Center for Research on Earthquake Engineering

The National Center for Research on Earthquake Engineering (NCREE) has two major laboratories, one in northern and one in southern Taiwan. Utilizing its expertise in experimental earthquake engineering technologies, NCREE focuses on R&D in three areas: "Seismic Performance Improvement," "Hazard Analysis and Risk Assessment," and "Monitoring and Early Warning" to meet the needs of pre-earthquake preparation, earthquake strain emergency response, and post-earthquake reconstruction. NCREE enhances research capacity and technological implementation in areas related to near-fault earthquakes and multiple-disaster scenarios, while creating industrial value by facilitating interdisciplinary collaboration and reinforcing connections between academia and industry. In terms of its mid-term objectives, NCREE aims to advance research on the seismic performance of critical infrastructure, develop cost-effective seismic design, evaluation, and retrofit technologies, and establish accurate, real-time early-warning systems and rapid, effective response measures. These efforts aim to achieve NCREE's long-term goal of building a sustainable, earthquake-resistant, seismic-safe homeland by enhancing national capabilities in both earthquake resistance and post-disaster recovery.

NCHC

National Center for High-performance Computing

The National Center for High-performance Computing (NCHC) is committed to bolstering Taiwan's fundamental scientific and technological capabilities by providing world-class supercomputing and network services for advanced research. By promoting the development and application of high-performance computing, networking, big data, and artificial intelligence, NCHC aims to "drive transformation for a better future". NCHC's efforts also include the development of trusted cloud services, generative AI, digital twin technologies, and big data service platforms, as well as research into forward-looking technologies such as cyber–physical integration, information security, quantum computing, and cryptography. In addition, NCHC facilitates digital transformation and advances in smart living by participating in international collaboration and exchange.

NCIR

National Center for Instrumentation Research

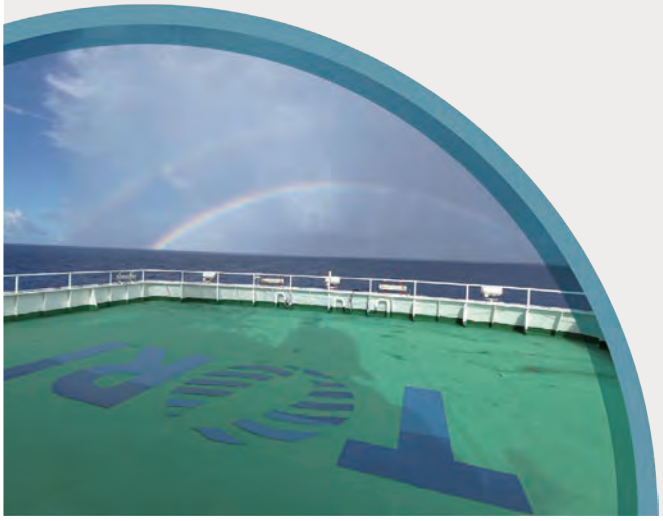
In alignment with the National Project of Hope, the policy objectives of the National Science and Technology Council (NSTC), and the core mission of the National Institutes of Applied Research (NIAR), the National Center for Instrumentation Research (NCIR) serves as an innovative foundry to provide customized instruments for academia, the private sector, and research institutions. NCIR continues to enhance world-class platforms for instrument development and talent cultivation in order to fulfill its mission of strengthening national R&D capabilities by enhancing advanced instruments. In addition, NCIR has become a key partner in the scientific research ecosystem by delivering solutions that integrate forward-looking technologies with high-end, research-specific instruments.

By connecting academia, the private sector, and research institutions, NCIR supports academic research and scientific discovery while promoting R&D and the real-world implementation of emerging technologies. NCIR also helps "Protect Taiwan through Innovative Technology," improves the quality of life for people throughout the country, and fosters the growth of emerging industries by training hands-on instrumentation professionals that ensure the continuous advancement of Taiwan's cutting-edge instrument technologies.

TORI

Taiwan Ocean Research Institute

Based on the research needs of the private and public sectors, academia, and research institutions, Taiwan Ocean Research Institute (TORI), develops innovative technologies, creates and maintains critical infrastructure for ocean research, and enhances precision detection capabilities for research vessels. TORI also promotes the development of the marine industry by leveraging technology to support scientific research, ocean engineering, and national land and marine surveys. Through the in-house development of critical ocean observation and sensing equipment, TORI aims to reduce the overreliance on imported instruments while expanding research topics beyond the constraints of commercial interests.



STPI

Science & Technology Policy Research and Information Center

For many years, the Science & Technology Policy Research Center (STPI) has provided timely, professional, and objective analysis and policy recommendations by analyzing global trends in science and technology. In the future, STPI aims to become a world-class think tank that is evidence-based, AI-driven, socially impactful, and capable of rapidly responding to emerging challenges. STPI's five core missions include: supporting government science and technology policy planning; assisting in the review and management of science and technology programs; supporting the development of public-sector science and technology industries; providing academic information and research services; and fostering an innovative ecosystem that bridges academia and research. Since its organizational restructuring in 2005, STPI has been committed to advancing both policy research and innovative services by creating comprehensive databases and service platforms for issues related to science and technology policy. In addition, STPI also periodically provides support to the National Science and Technology Council (NSTC) in drafting National Science and Technology Development Plan, and White Paper on Science and Technology as well as assistance in organizing the Executive Yuan National Science and Technology Conference. By providing comprehensive support for government science and technology agencies, STPI enhances Taiwan's overall national competitiveness while accelerating national S&T development and the application of innovative research.

TSRI

Taiwan Semiconductor Research Institute

The Taiwan Semiconductor Research Institute (TSRI) serves as a central hub connecting industry, academia, and research within Taiwan's semiconductor ecosystem. By integrating strengths in system-on-chip design and nanoscale device fabrication research, TSRI advances four core missions : building R&D platforms, supporting academic research, promoting frontier technologies, and cultivating high-level talent.

In 2025, TSRI achieved several major milestones. It launched the world's first academia-oriented silicon photonics CPO platform, connecting international partners such as imec and Synopsys to accelerate optoelectronic integration. In collaboration with Macronix, TSRI developed a capacitor-less 3D DRAM to address bandwidth bottlenecks in AI chips.

The launch of a 7 nm design environment and EDA Cloud 2.0 enabled academia's first 7 nm chip tape-out, narrowing the gap between academic research and industry standards. TSRI also established a chip-level 2.5D/3D heterogeneous integration validation platform, providing an open R&D environment aligned with industry-grade specifications.

Through science outreach programs and international talent cultivation initiatives, TSRI has trained more than 4,800 students and 348 European professionals over the past three years, reinforcing Taiwan's technological autonomy and strategic role in the global semiconductor supply chain.

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